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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Overseas Chemical Trade

THE Board of Trade returns for May show no improvement in the volume of chemical business done overseas. Against a decline of £411,505 in chemical exports, as compared with May of 1929, the only good point is a considerable decline of £120,895 in chemical imports. If the shrinkage is regrettable, it is at least fairly uniform. For the first five months of the year the decline in imports, as compared with the corresponding period of 1929, is actually greater than the decline in exports, the former being £765,286 and the latter £669,752. The actual totals of trade, however, still demonstrate how strong the position of the chemical industry is, compared with the majority of our other industries. The exports so far amount to £10,229,709, and the imports to £5,955,894. For a country that used to be described as an importing country, this excess of chemical exports over chemical imports is a distinctly striking feature, and, apart from the general shrinkage which has taken place in the past few months, the general balance as between exports and imports remains highly satisfactory.

Lord Melchett, in a statement issued this week, sets a good example in refusing to be pessimistic. The general sense of despondency greatly exaggerates the actual depression, and instead of helping to remove it only adds to its weight. If everyone followed his example and decided firmly to talk of prosperity and improvement, it would probably be the best tonic for trade that could be administered.

Ostend Nitrogen Conference

BY this time the proceedings of the synthetic nitrogen conference at Ostend, arranged to begin on Wednesday, are probably concluded, and in due course we shall hear if any important decisions have been reached. It was felt at the recent Paris Conference that before the negotiations for a world agreement between all classes of producers could proceed, it was desirable that the synthetic producers should be clear as to their own policy, and this seemed to present no special difficulty, apart from the reported action of Belgium. The Belgian producers, according to a well-informed writer in the *Financial News*, have turned out unexpectedly obstinate in their demands. They possess plant of the most modern kind; the details of its output and costs are known only to its owners, but, as with the German industry two years ago, surprisingly low costs per ton are claimed. The Belgians are comparatively newcomers to the industry, and no doubt they believe that an agreement based on their present position would do them less than justice. In such a situation it would not be unreasonable to suspect an ingredient of bluff in their arguments and demands. The Germans, on the other hand, are almost certainly anxious to secure a world agreement. Germany and America are the two largest exporters of chemicals in the world, and, to some extent, though by no means everywhere, they are in competition. The exports of Germany, however, are not as well diversified as those of America; over 20 per cent. of the total consists of synthetic nitrogen products. Clearly a price war in nitrogen could do severe damage to the German chemical exporters and might hinder their attempts to establish themselves in products other than nitrogenous. The signs, therefore, point in the direction of a compromise.

With the prospect also of an agreement with Chile, where the industry is to be rationalised and controlled on a national basis, it is a reasonable expectation that agreement may be reached as to a world price and as to certain general conditions. But the tendency is still towards increasing the total output capacity in every country, and the problem is how to increase the consumption capacity in proportion. Prices are even now not too high; they have been dropping over a considerable period. It is obvious that this tendency cannot be arrested while production continues to outrun consumption. How consumption is to be speeded up and how prices are to be kept at an economic level are the two real problems of the future.

Potash from Polyhalite

THE mineral polyhalite promises to become a factor in the growth of the American potash industry, according to the U.S.A. Bureau of Mines. Deposits of this potash-containing mineral have been found in Texas and New Mexico, in the course of the government drilling programme, in quantities sufficient for profitable commercial development, provided inexpensive chemical processes for the extraction of the potash salts can be devised.

Polyhalite is a sulphate of potash, lime, and magnesia. Pure polyhalite contains 15·6 per cent. of K_2O. Polyhalite in contact with water breaks down into its constituents; the sulphates of potash and magnesia go readily into solution, leaving a surface coating of gypsum on the polyhalite particles that partly protects them from further attack by the solvent and retards the rate of solution. In a large excess of water this gypsum will also be slowly dissolved. Experiments have proved that, using 4 parts of water to 1 part of polyhalite at ordinary room temperatures (21° C.), the potash minerals will all pass into solution in two to ten days, depending upon the degree of fineness of the material. Polyhalite occurs in the German deposits, but is not utilised in Germany as a source of potash because of the small and scattered nature of the occurrences, because it is rarely found in a relatively pure state, and because of the relative abundance of other potash salts more easily treated to yield concentrated products.

The amount of potash in a fertiliser that is considered "available" plant food is, of course, the amount soluble in distilled water. Various State laws regulating the manufacture and sale of fertilisers establish standards for "available" potash content, measured by water solubility, although polyhalite is soluble in distilled water, owing to the fact that it takes on a protective coating of gypsum in the presence of moisture, its rate of solubility is rather slow, and there is a prejudice among manufacturers and users of fertiliser against potash salts that are not quickly and completely soluble. This prejudice against polyhalite is now held to be unjustified by the fact that, in spite of its slow solubility, the potash content of polyhalite is actually "available" as plant food when the polyhalite is spread directly on the soil and exposed to soil conditions. Its slower decomposition would cause it to be retained in wet soils that require draining, and the potash applied to the soil in this form would not be removed rapidly by excessive rainfall. Pure polyhalite contains 15·6 per cent. of potash, and when produced commercially should contain 12 to 14 per cent. Crude polyhalite cannot therefore be used conveniently as an ingredient of fertiliser containing more than 16 to 20 units of plant food, but for lower-grade mixtures crude polyhalite would appear to be a satisfactory form of potash. It has the advantage over low-grade foreign salts in that it is entirely a sulphate, while the foreign kainites and manure salts contain potash in the chloride form. Crude polyhalite would be a satisfactory form of potash for nearly all average mixtures.

There is now a possibility of so treating polyhalite as to extract the potash in a concentrated form and of shipping this concentrated product to the fertiliser markets for use in the higher-grade mixtures. Experiments and research have been successful in outlining a process for the extraction of potash in concentrated form from polyhalite. This process, which is described in detail in Bureau of Mines Bulletin 316, by J. S. Wroth, may be made to yield either the sulphate of potash or the double sulphate of potash-magnesia or both, with a recovery of 80 to 85 per cent. of the potash contained in the original polyhalite. The production of crude polyhalite and of refined sulphate of potash-magnesia and sulphate of potash from domestic polyhalite may, it is stated, be considered as definitely possible. Mixtures of crude and refined salt can be prepared to yield any grade of mixed product desired between crude polyhalite (containing 12 to 14 per cent of K_2O) and refined sulphate of potash (containing 48 to 52 per cent. of K_2O).

"Octozone"

INFORMATION we were able to supply some time ago in answer to an inquiry has produced an interesting communication which it may be of interest to publish. The research chief of a northern textile works laboratory writes:—"Recently you gave us the address of the *Laboratoires des Chantiers du Rhone* in reply to our request in connection with a brief notice in your publication about ozonising apparatus. We have this week had a reply which is rather amazing in nature. The process is entirely gaseous and no electric spark is used in the production of ozone. But it is not ordinary ozone which is made—it is an allotropic modification of oxygen called 'Octozone' and given the formula O_8. Such a statement is of such scientific interest that we are wondering why we have heard no reference to it in purely scientific quarters. If the formula O_8 can be established, one would certainly expect wonders from such a new gas. Perhaps the references to the process are submerged in the patent specifications and the matter may be so new as not yet to have come to light." Our own records contain nothing that helps to elucidate the subject, but possibly the publication of this note may bring further information.

Books Received

THE MEASUREMENT OF HYDROGEN ION CONCENTRATION. By Julius Grant. London: Longmans, Green and Co., Ltd. Pp. 160. 9s.

PERFUMES, COSMETICS AND SOAPS. By W. A. Poucher. London: Chapman and Hall. Pp. 394. 21s.

A CONDENSED OUTLINE OF MODERN PHYSICAL CHEMISTRY. By Frederick Hurn. Constable. London: Ernest Benn, Ltd. Pp. 158. 10s. 6d.

The Calendar

June 20 to July 3	Ideal Holidays Exhibition. 11 a.m. to 9 p.m.	Royal Agricultural Hall, London.
June 26	Royal Society: "The Vapour Pressure of Muscle," A. V. Hill and P. S. Kupalov; "The State of Water in Muscle and Blood and the Osmotic Behaviour of Muscle," A. V. Hill; "The Gyromagnetic Effect for Paramagnetic Substances," W. Sucksmith. Communicated by A. P. Chattock. 4.30 p.m.	Burlington House, London.
27	National Physical Laboratory: Visit of Inspection. 3 to 6 p.m.	Teddington.

By-Product Ammonia—An Economic Aspect

By P. Parrish, A.I.C., M.I.Chem.E.

Among the papers presented by British chemical engineers at the World Engineering Congress, Tokio, in October-November, 1929, was one on certain economic aspects of by-product ammonia, by Mr. P. Parrish, well-known as an authority on the subject. In view of the growth of the synthetic ammonia industry and its obvious bearing on gasworks by-products, the writer's views will be of interest. The first instalment of the paper is published this week, and the remainder will follow in subsequent issues.

In a paper which the writer contributed to the World Power Conference, Fuel Conference, 1928, Great Britain, certain aspects of the by-product ammonia problem were dealt with. The object of this contribution is to examine one aspect in greater detail than was possible on the occasion referred to, and to answer the question :—Is it profitable for gas undertakings to manufacture concentrated gas liquor, rather than to dispose of gas liquor as such to chemical works at some distance, and incur expenses for its removal ?

The factors which have an important bearing on the economies of the production of concentrated gas liquor are as follows :—

(*a*) The ability of the gasworks to adopt a gas liquor concentration process.
(*b*) Strength of gas liquor produced at the gasworks.
(*c*) Relative charges in respect of transport of gas liquor and concentrated gas liquor.
(*d*) Costs of concentrating gas liquor, and
(*e*) Relative value of the two products, *i.e.*, gas liquor and concentrated gas liquor.

Not only is it important that the above factors should be examined in detail, but their influence should be judiciously correlated.

(a) Ability of Gasworks to Adopt a Gas Liquor Concentration Process

Some works are precluded from adopting a process for the concentration of gas liquor on account of their liability to dispose of the resulting effluent liquor. The proximity of such a works to another gasworks may render it profitable to send the gas liquor to an adjacent gasworks for concentration rather than to send it to the chemical works, where its final treatment would be undertaken.

In other words, just as it may be advisable to centralise chemical works treating concentrated gas liquor, so it is conceivable that a congeries of gasworks within strictly limited areas could combine and produce concentrated gas liquor at a central gasworks to mutual advantage.

In this way not only would a solution be found of the effluent liquor disposal problem, but economies of capital expenditure and working costs would be effected.

As this aspect is outside the purview of the present consideration, it is not proposed to pursue the matter further. It could, however, be developed, if need be, by considering a scheme embracing the gasworks within an eight miles radius of the works of certain known Gas Companies. Here there are typical congeries of gasworks, any scheme in connection with which may well represent the basis of an arrangement for other congeries of gasworks throughout Great Britain.

(b) Strength of Gas Liquor Produced at the Gasworks

That the strength of the gas liquor has an important bearing on the economics of the production of concentrated gas liquor cannot be doubted. Obviously, more steam is required to disengage a unit weight of ammonia from a weak liquor than from a strong liquor if one seeks to obtain an identical efficiency as regards the stripping of the ammonia. The same amount of heat (in other words, steam) is required to dissociate a unit weight of ammonia from any strength of gas liquor, but (disregarding the H_2S, CO_2, HCN, etc., contents of the gas liquor) the amount of water to be raised from the temperature of dissociation varies widely, as is shown below :—

TABLE A.—Showing lb. of H_2O and B.Th.U.'s required per 1 lb. of Ammonia in Varying Strengths of Gas Liquor.

Per Cent. NH_3.	Lb. water to be raised from temperature of preheat—176° F.—to temperature of dissociation—212° F.	B.Th.U.'s involved.
2·5	40·00	1,760
2·0	50·00	2,200
1·5	66·66	2,903
1·0	100·00	4,400
0·5	200·00	8,800

But there is a more important factor than the foregoing, which concerns the consumption of steam. This relates to the concentration of ammonia in the steam-ammonia stream leaving the still. Accepting a pre-determined efficiency, under the conditions involved in the manufacture of concentrated gas liquor, for a given throughput the steam consumption depends on the concentration of ammonia in the gas liquor, which, again, is strictly related to the concentration of ammonia in the steam-ammonia stream.

What the ammonia concentration in the steam-ammonia stream is likely to be for a given strength of gas liquor depends essentially on the rate at which the still is operated. Within limits, any desired ammonia concentration in the steam-ammonia stream can be obtained, provided the rate of feed of gas liquor and steam are controlled. But obviously, this ammonia concentration can only be obtained at the expense of throughput, which, in other words, implies an extra cost from the point of view of labour.

Apart from the latter consideration, by returning to the still a certain quantity of reflux liquor of a specific strength, any desired concentration of ammonia, in the steam-ammonia stream, can be obtained ; in other words, any desired strength of concentrated gas liquor, short of the strength at which ammonium carbonate crystallises, say, up to 16 per cent. NH_3, can be manufactured, but only at the expense of the efficiency of the plant.

Under ideal conditions, the performance of an ammonia still will be strictly related to the number of units of ammonia and water with which it deals efficiently, that is, the relative number of units of ammonia and water actually discharged from the still in the steam-ammonia stream in relation to the number of units of ammonia and water leaving as effluent liquor relative to the steam consumed.

Under present conditions we are perforce compelled to introduce another factor, namely, the additional water to be evaporated, due to the return of reflux liquor, when contemplating the production of a given strength of concentrated gas liquor from varying strengths of ammoniacal liquor.

It will be of interest to indicate the method of calculation. Gas liquor containing 2·5 per cent. NH_3 may be converted to concentrated gas liquor of 16 per cent. NH_3 concentration, without taking advantage of the dephlegmator which is normally part of the plant provided for concentrated liquor manufacture. Gas liquor containing 2 per cent. NH_3, when converted to concentrated gas liquor without resorting to the refluxing of the condensate from the dephlegmator, only gives a concentration of 13·5 per cent. of ammonia.

In the case of a gas liquor containing 1·0 per cent. NH_3, the concentration of ammonia in the gas stream will be 7·0 per cent. This will be associated with :—

$$\frac{7\cdot0}{16}\times 17\cdot6 = 7\cdot7 \text{ of } H_2S \text{ and } CO_2 \text{ and}$$

$$100-(7\cdot7+7\cdot0) = 85\cdot3 \text{ parts of water.}$$

To ensure a concentration of 16 per cent. NH_3 in the concentrated gas liquor, 7 parts of NH_3 must be associated with :—

$$\frac{66\cdot4\times 7}{16} = 29\cdot1 \text{ parts of water.}$$

It is clear that $85\cdot3-29\cdot1 = 56\cdot2$ parts of water must be removed by dephlegmation from the system for every 7 parts of NH_3, or :—

$$\frac{56\cdot2}{7} = 8\cdot03 \text{ lb. per lb. of } NH_3.$$

The advantage to be derived from preheating gas liquor in the manufacture of concentrated gas liquor from gas liquor is shown by figures. Where preheating is arranged to the extent of 176° F., it will be seen that the heat absorbed in raising the water to the temperature of the dissociation of ammonium compounds is 2,200 British Thermal Units, whereas in the absence of preheating 6,400 British Thermal Units are demanded.

It will be appreciated that the strength of the concentrated gas liquor produced has an important influence on the steam consumption, other things being equal. This is clearly shown in the following table, representing the lb. of water to be evaporated in the production of varying strengths of concentrated gas liquor per lb. of ammonia.

TABLE B.

Strength of concentrated gas liquor. Percentage NH_3.	Lb. of water to be evaporated per lb. of ammonia.
13·0	5·592
13·5	5·324
14·0	5·057
14·5	4·828
15·0	4·600
15·5	4·375
16·0	4·150

Here again the question of the optimum capacity of the still plays a significant part.

(c) Railway Charges in Respect of the Transport of Gas Liquor and Concentrated Gas Liquor

The method of arriving at railway rates has undergone modification during the last few years, and has undoubtedly been simplified by the publication in January, 1928, of *The General Railway Classification of Goods by Merchandise Trains* (obtainable from the Railway Clearing House, London, N.W.1), and *The Scale of Standard Charges in Respect of Goods and Minerals in Classes 1 to 21 by Merchandise Trains*. These charges are applicable to traffic elsewhere than in Scotland and the North Eastern (England) section of the London and North Eastern Railway, which section comprises the lines formerly known as the North Eastern Railway, the old portion of the North British Railway situate in England, the Brackenhill Light Railway, the Forcett Railway, and the Great North of England, Clarence and Hartlepool Junction Railway.

It will be found on page 112 of *The General Classification of Goods by Merchandise Trains*, that gas water or gas liquor in owners' tank wagons, 8-tons per truck, is included in Class 1, and in casks or iron drums it is included in Class 5, whereas ammoniacal liquor (concentrated gas liquor), in owners' tank wagons, 8-tons per truck, comes under Class 3, and in casks or drums under Class 6.

Reference to pages 2 and 3 of the "Scale of Standard Charges" gives details of the basis of the scale of charges in respect of goods and minerals by merchandise trains. It is an easy matter, therefore, to compute what the charge for the conveyance of gas water or concentrated gas liquor will be. For example, assuming the distance between the sidings of two gasworks is sixty miles, the charge for the transport of gas water will be as follows :—

	s.	d.
20 miles at 1·90d.	3	2
30 ,, ,, 0·95d.	2	4½
10 ,, ,, 0·55d.	0	5½
	6	0
Station terminal at each end, 3d.	0	6
	6	6

In the case of concentrated gas liquor, coming under class 3, the charge would be as follows :—

	s.	d.
20 miles at 2·25d.	3	9
30 ,, ,, 1·10d.	2	9
10 ,, ,, 0·80d.	0	8
	7	2
Station terminal at each end	1	0
	8	2

Working on the data in question, the following figures for gas water and concentrated gas liquor by rail in owners' tank wagons on a mileage basis have been determined.

TABLE C.

Miles from Siding	Gas water Per ton. s.	d.	Concentrated Gas Liquor. Per ton. s.	d.
10	2	1	2	11
20	3	8	4	9
30	4	6	5	8
40	5	3	6	7
50	6	1	7	6
60	6	6	8	2
70	7	0	8	10
80	7	5	9	6
90	7	11	10	2
100	8	4	10	10
110	8	9	11	5
120	9	2	12	0
130	9	7	12	7
140	10	0	13	2
150	10	5	13	9

(d) Cost of Concentrating Gas Liquor

To confirm the writer's experience concerning the costs of manufacturing concentrated gas liquor, inquiries have been made at several works that are accustomed to operate such plants. Where figures have been supplied there are features of an unsatisfactory nature, relating to one or more of the items of cost. Either disabilities exist at the works as regards the disposal of the effluent liquor, or labour charges are unduly high, due to special circumstances, or the lime consumption is excessive, or inflated ideas prevail about the rate of interest on capital and depreciation, and no less so as to the capital value of the plant.

That works accountancy in relation to the treatment of by-product ammonia at many gasworks leaves something to be desired cannot be gainsaid.

The costs of producing concentrated gas liquor depend on the scale of operations. A plant producing 12 tons of concentrated gas liquor per day requires no more labour than one man per shift for the operation of the plant and the generation of the necessary steam. If one, two or three tons only of concentrated gas liquor per day are produced, no economy of labour can be effected over the case just cited.

The former represents a medium sized works, the latter a small works.

Where large gasworks are concerned, plant can be erected to produce 50 tons of concentrated gas liquor per day, and such plant and the steam generation unit can be worked by two men per shift, and one day man only for the production of cream of lime.

Many suppose that it is desirable to convert existing sulphate of ammonia plants to concentrated gas liquor units. This may be true in some cases, but those who have had occasion to consider this proposition in all its bearings must have realised that the size of the plant is in many cases a distinct economic handicap.

When the manufacture of sulphate of ammonia was a profitable enterprise, it does not appear that much consideration was given to determining what the optimum size of a unit should be for any given works.

The capability of the plant to deal with peak loads, and initial capital expenditure, appear to have been the primary considerations, and not economy of working. Thus it happens that to-day there are many sulphate of ammonia plants at both small nnd medium sized works which are unnecessarily small, and can hardly be regarded as economic units for conversion to concentrated gas liquor manufacture.

Moreover, it must be remembered that the ammonia concentration in the steam-ammonia stream issuing from most of the stills at the sulphate of ammonia plants installed at the majority of gasworks in Great Britain has been of the order of 10 per cent.

As this concentration must necessarily be raised to 15 per cent., this can only be effected at the sacrifice of throughput, or, assuming an attempt is made to maintain this, by incurring loss of ammonia in the effluent liquor. Thus it is seen that the problem demands greater consideration than is generally supposed.

What considerations should be observed in deciding upon an economic unit of plant ?

Provided always that the plant is capable of dealing with peak load requirements, the primary factor involves a correlation of labour costs per ton of product manufactured in relation to the charges per ton in respect of depreciation and interest on capital. By working out a series of examples, it is possible to ascertain the optimum size of any plant for a given make of concentrated gas liquor.

It is impossible to examine this aspect further here, but it is sufficient to have directed attention to its importance.

It will be well now to furnish a typical cost sheet relating to the manufacture of concentrated gas liquor at one of these small works, and subsequently to examine it in greater detail, to determine certain features which are characteristic of all cost sheets relating to the manufacture of concentrated gas liquor.

TABLE D.

Estimate of the cost of manufacture of one ton of concentrated gas liquor, in a plant capable of distilling 20 tons of gas liquor per day, as applying to a gasworks carbonising 9,000 tons of coal per annum. Strength of gas liquor—10 oz. (2·17 per cent. NH_3).

	£	s.	d
(*a*) Steam for pumping and distillation (assuming full heat conservation), say, 20% on the weight of gas liquor distilled. 20 tons of gas liquor × 20% weight of steam = 4 tons at 3s. = 12s. 7·27 tons of gas liquor (10 oz. strength), yield 1 ton of concentrated gas liquor of 15% NH_3, at 95% working efficiency. $\frac{20}{7·27}$ = 2·75 tons of concentrated gas liquor. $\frac{12s.}{2·75 \text{ tons of concentrated gas liquor.}}$ ..	0	4	4
(*b*) Labour. 3 shift men at 12s. 6d. per shift = 37s. 6d. per day. $\frac{37s. 6d.}{2·75 \text{ tons of concentrated gas liquor produced per day}}$	0	13	8
(*c*) Supervision, chemical and general	0	1	6
(*b*) Lime. Based on 20% of fixed ammonia, 10 oz. gas liquor = 2·17% NH_3, w/v. 20% fixed ammonia = 0·434% NH_3, w/v. In 1 ton of gas liquor there is = 0·00434 ton of fixed ammonia. 7·27 tons (to produce 1 ton of concentrated gas liquor, 15% HN_3) ..... = 0.03155 ton of fixed ammonia, or 70·67 lb. of ammonia per ton of concentrated gas liquor, CaO : $(NH_3)_2$ 56 : 34 34 : 56 : 70·67 : x. lb. fixed ammonia per ton of concentrated gas liquor.			
Carried Forward	0	19	6
Brought Forward	0	19	6
$\frac{56 \times 70·67}{34}$ = 116·4 lb. CaO. Only 5% over theoretical need be used to ensure complete exchange of bases, and therefore the complete dissociation of what otherwise was the fixed ammonia. 105% of 116·4 lb. CaO = 122·2 lb. Lime is bought on the basis of 90% CaO, therefore the quantity of lime used $= \frac{122·2}{90} = 135·8$ lb. 135.8 lb. of lime at 2s. per cwt.	0	2	5
(*e*) Sludge removal and effluent treatment	0	1	6
(*f*) Water for cooling (400 gallons per ton of concentrated gas liquor)	0	0	6
(*g*) Cost of Pumping concentrated gas liquor to railway tank	0	0	6
(*h*) Rates, Taxes and Insurance	0	1	0
(*i*) Alkali Certificate $\frac{£6}{166 \text{ tons}}$ say	0	0	8
(*j*) Interest on capital on plant and storage boilers at 6% on £700 = £42. $\frac{£42}{166 \text{ tons}}$ say	0	5	0
(*k*) Depreciation on plant and storage boilers at 7½%	0	6	3
(*l*) Interest and Depreciation on buildings, say, 20% of "j" and "k"	0	2	3
	£1	19	7

A study of the foregoing cost sheet will make evident that the cost of manufacture of concentrated gas liquor will vary (*a*) with the strength of the gas liquor and (*b*) with the quantity of fixed ammonia which the gas liquor contains. The weaker the gas liquor, the more steam will be required to disengage the ammonia. This aspect has already been dealt with in the earlier part of this report, from a thermal point of view.

It will be interesting at this juncture to attempt to reconcile the steam figure included in the foregoing cost sheet with the figures for minimum steam consumption as has been discussed and computed previously in this report.

For several reasons, minimum figures are unattainable, even on large and well-controlled plants. That they will fall short of realisation to a greater degree on the plants installed at small gasworks would appear certain.

The limiting conditions that affect the design of stills for minimum steam consumption are these. If the gas liquor is not heated to the boiling point for the still pressure, then heat is absorbed to attain a temperature equivalent to the steam pressure.

Assuming all the gas liquor is introduced to the still at the boiling point for the still pressure, further heat absorptions are represented by the dissociation of the ammonium salts, the hydrate, radiation losses and the elevation of boiling point, due to increasing pressure as the liquor descends the still.

All these are represented by condensation and loss of superheat, if any, of the steam, and are irreducible.

Further a vehicle has to be provided to aid the release of the ammonia, and the steam employed would appear to have a minimum value as represented by Piron's values (see *Design and Working of Ammonia Stills*—Parish).

The view is held by some technicians who have considered this subject, that the partial pressure of ammonia in solution of its compounds at about 100° C. is not the only quantity which appears to matter. Without attempting to discuss the more obscure aspects of the problem, it is known to those who have had occasion to work different types of stills under varying conditions that the actual consumption of steam ranges from 1·25 to 1·5 times the minimum quantity required, and that part of the excess steam is represented by losses to be made up due to the entrainment between the respective trays, and to radiation losses.

In view of the foregoing observations, it is necessary to show the relationship between minimum steam consumption and practical results, as representing steam for pumping and distillation. The case will be examined of 10 oz. gas liquor having a content of 2·17 per cent. NH_3 w/v.

If one takes the mean steam consumption as applying to gas liquor of 2·5 per cent. and 2·0 per cent. ammonia, one will not be wide of the mark.

	Lb. steam per lb.
2·5 per cent NH_3	10·19
2·0 per cent. „	12·19
	22·38
Mean	11·19 lb.

In 7·27 tons of gas liquor (the quantity required for the production of one ton of concentrated gas liquor, 15 per cent. NH_3), there are :

$$\frac{7·27 \text{ tons} \times 2{,}240 \text{ lb.} \times 2·17}{100}$$

or 353·4 lb. of ammonia.

Basing on the above steam consumption of 11·19 per lb. of ammonia, the total steam consumption will be 3,954 lb.

Adjustments have, however, to be made in two respects, in order to reconcile the foregoing minimum steam figures with the practical figures named in the cost sheet.

The minimum steam figures relate to concentrated gas liquor, 16 per cent. NH_3 content. The practical figure refers

to concentrated gas liquor of 15 per cent. ammonia concentration. This means that an additional 0·45 lb. of steam per lb. of ammonia is required, or 353·4 lb. × 0·45 = (say) 159 lb.

Thus: 3,954 lb. + 159 lb. = 4,113 lb.

If (say) one and a half times the minimum quantity of steam is required in works practice, then the consumption will be 6,170 lb., or 2·75 tons of steam, per ton of concentrated gas liquor of 15 per cent. HN_3, as against the four tons provided for in the cost sheet.

The last-named figure provides, in addition to what has already been indicated, for (*a*) pumping of the gas liquor from the storage wells to an overhead gravity feed tank, (*b*) the sludging-down of the stills, (*c*) the steam required to produce the necessary cream of lime, and (*d*) the pumping of the latter to the still. It is therefore a reasonable figure, and one that should be realised in practice, even by small works.

Effects of Fixed Ammonia

The quantity of fixed ammonia which a gas liquor contains obviously affects the amount of lime which must be used in order to ensure an exchange of bases and the dissociation of what was hitherto the fixed ammonia. The nature of the fixed ammonia also affects the quantity of sludge which will be produced, and which must necessarily be removed. If the fixed ammonia is largely in the form of ammonium chloride, no sludge will result, as calcium chloride is soluble. On the other hand, if the fixed ammonia is largely in the form of ammonium sulphate, calcium sulphate will be the resultant product, and this will necessarily involve removal.

It has been assumed that the effluent spent liquor will be disposed of without resorting to any treatment, after deposition of the sludge, other than storage. The rate of discharge in relation to the volume of town's sewage should be such as to occasion no prejudicial effect at the sewage works.

The influence of labour and interest on capital and depreciation on the plant, has already been discussed, and an indication afforded as to how an optimum sized plant can be selected, which will give the most economic operation in respect of these items.

In short, it will be seen that there are certain costs, such as interest on capital and depreciation on buildings, interest and depreciation on plant, and labour which vary with the size of the plant, irrespective of the characteristic of the feed liquor. On the other hand, the costs of steam for distillation vary with the characteristics of the liquor, but are unaffected (otherwise than as stated in the earlier part of this report), by the size of the plant. Similarly, the cost of lime and expenses in the removal of sludge, and equally, the question of effluent treatment, depend essentially on the quality of the gas liquor, and are unaffected by the size of the plant.

Varying Conditions

It will be appreciated that works accountancy at small (and indeed, for that matter, at medium and large sized), works, does not admit of the preparation of so elaborate a cost sheet as the foregoing. In point of fact, gas managers and gas engineers have usually an imperfect knowledge as to the costs involved in the treatment of gas liquor.

No single cost sheet can be applicable to a series of works, or to any specific size of works. The varying local conditions obtaining at gasworks necessitate that each case should be considered separately, and on its merits. It is therefore no easy matter to generalise with regard to the cost of concentrating gas liquor. To assist, however, in a rapid determination of some of these costs, chart No. 3, which forms an appendix to this report, has been prepared.

The cost of producing concentrated gas liquor, 15–16 per cent. NH_3, at medium sized works may be regarded as 27s. 6d. per ton, when produced from gas liquor of 10 oz. (2·17 per cent. NH_3) strength.

So far as large works are concerned, it should be possible to produce concentrated gas liquor, 15–16 per cent. NH_3 concentration, at between 22s. 6d. and 25s. per ton, according to the capital cost of the plant and local circumstances.

Before an answer can be given to the question :—" Is the concentration of gas liquor likely to prove an economic proposition ? ", it is necessary to be in possession of data regarding the relative values of gas liquor of varying strengths and concentrated gas liquor of varying strengths.

(To be continued.)

Unemployment and Work

By Sir Ernest J. P. Benn

The methods of the modern employer and the penalty of forsaking the principles of private enterprise working solely to satisfy the needs of others, are examined in their relationship to the unemployment problem in Sir Ernest Benn's article below. Previous articles in this series appeared in The Chemical Age *of May 3, 10, 17, 24, 31 and June 7 and 14. "Housing, the Key" will be the title of next week's article.*

VIII.—The Employer's Responsibility

The unemployed is, of course, always a worker. The dole is only paid to that class of person who still reserves to himself the title of " a working man," and thus it comes about that the discussion of unemployment tends in the main to mean a discussion of the so-called working man, his habits, his failings or his qualities. Such a discussion leaves out of account the larger part of the problem considered as a whole. Unemployment is as much, or more, concerned with the doings of employers as with the actions of those whom they employ.

When the first quarter of this century is old enough to be fit material for the historian, somebody will point out the biggest of the movements which have characterised recent years. Whereas in the nineteenth century public opinion looked to the business classes for the supply of the material needs of life, it is unquestionably the fact that the people of the twentieth century have so far inclined to the view that the politicians could be of more use to them than the merchants and manufacturers. The country is looking to the political method rather than the private enterprise method, and still seems to think that through political action a solution of our economic difficulties may be found. That is a false view, the error of which is slowly dawning upon the people. They will in time learn again, what they should never have forgotten, that so far from the Government being able to take the place of private enterprise in trade, the continuance of the Government itself depends absolutely and entirely upon the well-being and prosperity of trade conducted by private persons which can be taxed for Government support.

In the meantime, however, we find on examining the matter closely that the habit of depending on the Government, so disastrously prevalent in the working classes, is also developed to a highly dangerous degree among employers and all other classes. There is some excuse for it. The Government has pretended, and goes on pretending, to be able to develop trade. We still have a Department of Overseas Trade, although the Geddes Committee on two occasions reported in favour of its abolition. This Department goes on growing and goes on fussing about at home and abroad, keeping card indices and issuing reports, and in its innocence imagining that in some way or another it is helpful to the interests of British industry. Parliament appears to remain firm in this false opinion, notwithstanding the disturbing fact that trade gets worse and worse as the Department of Overseas Trade gets bigger and bigger.

It seems to be forgotten that the presence of a lot of salaried officials in any market drives out of that market all the free and independent business men. It is Gresham's currency law over again. Very little thought is necessary to understand how natural this is. The independent business man, making his own inquiries into the possibilities of a market for his specialities in Rumania or Finland, will feel a nervousness which is, perhaps, stupid, but none the less natural, if he knows that Government officials are ferreting about in the same market, producing information and reports which may or may not be any good, but which will be available for everybody else in the trade. In these circumstances, the individual not unnaturally leaves the market alone. The element of com-

petition between him and other people in the trade is eliminated, and without competition trade can do nothing but wither and decay.

Working under Disadvantages

The modern employer requires a much more highly developed sense of responsibility than was ever asked from his predecessor. He has to work under disadvantages that were unknown to previous generations. They had incentives left to them of which he has been robbed. It requires much more pluck in these days for a successful manufacturer to undertake an extension of his business than was necessary even a few years ago. Mr. Snowden's Budget has sown the seeds of another big batch of unemployment by adding to the numbers of successful men who are now faced with the new danger that they may worsen their position by adding to their prosperity. There are many hundreds of leading employers full of experience and knowledge, anxious and willing to use it in the extension of the trade of the country, now faced with the necessity of spending their remaining years in getting their resources into a condition which is liquid enough to meet the heavier demands of the new death duties. All these people, unless, as I say, they possess a very highly developed sense of public duty, are stopped from performing their natural functions as the providers of employment. Government interference thus works both ways. On the one hand, it discourages a man from undertaking new enterprise by pretending to do it for him, and, on the other hand, it makes it clear to him that if he does it himself he will be punished for so doing.

The spirit of the dole, the spirit of dependence, of helplessness, the mentality which leaves everything to the arrogant claims of official authority, is as deadly in its effects upon the employing classes as upon any of the rest of us. It is hard to estimate how much of the business brains of the country has been diverted from the natural study of markets to the study of the more complicated problems of subsidies, guarantees, tariffs, safeguards and other political substitutes for work and effort.

The Functions of an Employer

It would, I think, be extremely useful if more emphasis were laid upon the profession of employing, and if more study were given to the functions of an employer as distinguished from a merchant or a manufacturer. The man who sets up in business assumes a variety of responsibilities. He puts up a sign on the front of his premises which announces him to be a manufacturer of something, and the public is inclined to think of him wholly in connection with the something which he sells. That, however, is a rather limited view of the average manufacturer. He not only makes an article but he employs a number of people in so doing. The best among our manufacturers think a good deal more of their responsibilities as employers than of their work as mere business men. It is their function to organise the work of a number of other people and to adjust the markets on both sides, and all the incidents associated with the undertaking for which they are responsible, to the requirements and the convenience of the people whom they employ. It would, of course, be absurd to claim of the manufacturers as a whole that this side of their natural function is always uppermost in their minds, but few will be found to deny its weight and its importance with the better type of employer. There are some trades, such as large scale contracting and railway building, where no employer could ever pretend to be responsible for his workpeople for the period of their lives. The very nature of the work requires that a number of people shall undertake it for a limited time. But that, after all, is a mere fraction of our trade, and most of it can be done, as much of it is already done, with a view to the constant employment of a given number of people who have developed in them a due sense of the unity of interest between employers and employed.

There is another way in which the responsibility of employers has tended to drop into the background in recent years. If a return could be compiled showing the number of hours spent in recent years by business men sitting on committees to deal with futile political obstruction, and if it were at the same time remembered that all those hours might have been spent by those same business men in calling on customers, a better conception of the real reason of our industrial plight would be secured. This committee habit is beginning to wane, because, after all, business men still have a certain sense of the value of their time. They are beginning to rebel at weary hours spent in considering documents which will in due course be sent on to some other advisory body only to waste, as they proceed from authority to authority, more valuable time on the part of others, and in the end to achieve nothing.

Mention of the committee habit brings out yet another aspect of this question of the employer's responsibility for unemployment. The war did one good piece of work for us in that it perfected the habit of consultation between members of a given trade. The trade union, the trade association and the joint council were for war purposes brought to the point of the highest efficiency, but it is on the consciences of many business men that that efficiency tends to be used in the interests of the trade as distinct from the interests of the community. Just as we have trade unions which deliberately limit the right of the rest of us to undertake certain classes of work, so we have developed trade associations and joint councils which tend to be afflicted with the same unsocial folly. The case for the trade union and for the trade association and for the joint council disappears entirely unless these bodies are prepared to accept their responsibilities as citizens, to remember that their trade is a service to society as a whole, and to use their powers to extend, develop, and facilitate that service. The moment when any of these organisations begins to play the trust or combine, and tends to create scarcity in order to enhance price, it becomes a social evil. It not only robs the rest of us of the enjoyment of products which might be ours, but fills its own pockets with inflated prices at the cost of the unemployed to whom it denies the right to work. We have followed far too closely and taken too literally the old adage that "union is strength." We forget that such strength may be used for evil as well as for good. We overlook the warlike implications in "union is strength." No one can doubt the truth of the saying when it is a question of war. There is some doubt in my mind whether the natural tendency of union is not to use its strength for war, and whether, therefore, all these unions, of whatever kind, do not tend to make war upon the rest of us. If that is so, then we arrive at another of the many explanations required to account for the unemployment difficulties which we are discussing.

Inflated Prices

Many of our employers have yet to understand that high prices do not necessarily mean prosperity. A good deal of our difficulty arises from the present clinging of some of our employers' associations to inflated or unnatural prices. This difficulty is perhaps most notable in connection with associations of retail traders. It is evident when one looks at the index figures of wholesale and retail prices. Manufacturing and wholesale trades have done much more than their retail colleagues in the difficult work of getting back to normality. The result is that wholesale prices and wages have in many cases come near to reason, only to find that when their products reached the retail market the old inflated figures remained. There is probably no one cause which has more to do with unemployment to-day than this. We really must give up the theory that wealth can be secured out of small quantities and high prices. Money, it is true, may be got that way, but always at the cost of suffering to others. Real wealth, which consists in goods and services, can only be got and developed by a policy of increased production at an ever-decreasing price. If these basic principles were properly understood by employers and employed, we have to-day, with all the machinery of trade organisation, wonderful opportunities for increasing the wealth of the community and raising the standard of living. What is wanted is a change of heart, an alteration in the point of view. One by one our traders must begin to re-absorb the old spirit of service. They must recognise that they exist for the purpose of supplying the needs of others, and no other excuse can be found for their activities. They must realise that in the long run wealth and prosperity will come to them from an expression of this view, and that any temporary gains obtainable from its denial can never be anything but very temporary in their nature.

"The Title, 'Chemist'"

"I SEE you describe youself as a chemist. Are you a member of the Pharmaceutical Society?" asked Mr. Campion of a defendant at the Tower Bridge Court on Saturday.

Accused: "No. I'm a crane driver at an Epsom salt works."

British Chemical Overseas Trade for May

A Decline in Exports

THE Board of Trade returns for May show an all-round decline in British chemical trade compared with the corresponding month of last year, and there was a particularly heavy drop in exports. Import figures at £1,221,492 show a decline of £120,895, exports at £2,045,556 have dropped £411,505 and re-exports at £67,902 over £2,000.

Imports

	Quantities Month ended May 31,		Value Month ended May 31,	
	1929.	1930.	1929.	1930.
			£	£
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acetic anhydride ..cwt.	Tons 57			169
Acid Acetic .....tons	1,015	455	38,093	16,105
Acid Tartaric ....cwts.	3,542	3,049	24,682	19,416
Bleaching Materials ,,	9,357	6,609	9,116	12,335
Borax..... ,,	14,770	14,609	10,517	8,700
Calcium Carbide .. ,,	94,531	71,989	58,104	42,941
Coal Tar Products value	—	—	96,034	4,448
Glycerine, crude ..cwts.	146	4,235	334	6,423
Glycerine, Distilled ,,	1,191	977	2,966	2,321
Red Lead and Orange Lead.....cwt.	3,459	4,023	5,132	6,042
Nickel Oxide ..... ,,	—	144	—	857
Potassium Nitrate. ,,	10,251	13,648	10,328	12,602
Other Potassium Compounds ..... ,,	234,072	158,544	75,511	53,668
Sodium Nitrate .. ,,	74,984	64,497	38,736	32,416
Other Sodium Compounds ..... ,,	39,829	29,477	26,045	19,031
Tartar, Cream of .. ,,	3,432	2,354	15,387	10,733
Zinc Oxide .....tons	1,120	1,370	33,753	30,915
All other Sorts ...value	—	—	336,896	260,551
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....ozs.	101,514	156,534	7,508	12,057
Bark Cinchona (Bark, Peruvian, etc.) ..cwt.	839	2,110	4,351	9,826
Other Sorts .....value	—	—	134,260	249,134
DYES AND DYESTUFFS—				
Intermediate Coal Tar Products .....cwt.	107	225	1,882	2,620
Alizarine ..... ,,	158	44	4,467	1,954
Indigo, Synthetic . ,,	—	—	—	—
Other Sorts ..... ,,	4,441	4,338	91,137	102,174
EXTRACTS FOR DYEING—				
Cutch ..... ,,	3,453	6,204	5,903	10,916
Other Dyeing Extracts cwt.	3,423	2,784	10,885	10,507
Indigo, Natural ... ,,	31	34	950	945
Extracts for Tanning ..... ,,	86,833	93,622	95,652	91,818
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, .. ,,	51,708	47,194	11,751	9,906
White Lead (dry) . ,,	13,463	16,753	22,994	27,530
All Other Sorts .... ,,	111,588	109,480	169,013	152,432
Total of Chemicals, Drugs, Dyes and Colours ....value	—	—	1,342,387	1,221,492

Exports

	Quantities Month ended May 31,		Value Month ended May 31,	
	1929.	1930.	1929.	1930.
			£	£
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ...cwt.	7,782	7,221	3,668	2,490
Acid Tartaric ..... ,,	1,278	785	8,773	5,295
Ammonium Chloride (Muriate) .....tons	217	484	5,261	8,109
Ammonium Sulphate—				
To Spain and Canaries tons	3,288	11,353	33,174	89,948
,, Italy ..... ,,	535	542	5,112	5,406
,, Dutch East Indies	1,182	1,089	12,525	9,572
,, China (including Hong Kong) tons	6,864	12,622	73,108	107,201
,, Japan ..... ,,	14,710	8,075	151,163	67,126
,, British West India Islands and British Guiana tons	2,427	1,475	24,828	12,172
Other Countries ,,	4,723	6,759	48,170	57,452
Total ..... ,,	33,729	41,915	348,080	348,877
Bleaching Powder ...cwt.	66,421	53,553	18,679	15,924
COAL TAR PRODUCTS—				
Anthracene .....cwt.	—	—	—	—
Benzol and Toluol .galls.	937,405	9,603	66,743	1,421
Carbolic Acid .....cwt.	cwts. 3,190			7,395
Cresylic acid .....galls.	19,356 159,265		30,576	17,998
Naphtha ..... ,,	8,435	3,421	750	398
Naphthalene (excluding Naphthalene Oil) cwt.	9,222	6,159	3,647	2,360
Tar Oil, Creosote Oil, etc. .....gall.	2,962,355	2,990,469	86,397	66,088
Other Sorts .....cwts.	24,727	33,487	14,144	17,886
Total .....value	—	—	202,257	113,546
Copper, Sulphate of .tons	3,014	4,974	81,723	114,469
Disinfectants, Insecticides, etc. .....cwts.	41,235	32,437	100,218	67,139
Glycerine, Crude ....cwts.	4,841	5,410	6,134	10,285
Glycerine, Distilled .. ,,	8,540	3,903	21,608	10,276
Total ..... ,,	13,381	9,313	27,742	20,561
POTASSIUM COMPOUNDS—				
Chromate and Bi-chromate .....cwt.	1,844	1,761	3,820	3,478
Nitrate ..... ,,	1,278	1,083	2,444	2,039
All other Compounds cwts.	4,004	3,888	16,248	13,964
Total ..... ,,	7,126	6,732	22,512	19,481
SODIUM COMPOUNDS—				
Carbonate, including Soda Crystals, soda Ash and Bicarbonate cwt.	470,376	465,190	142,780	124,891
Caustic ..... ,,	246,243	159,386	161,098	104,302
Chromate and Bichromate ..... ,,	3,899	2,015	6,695	3,290
Sulphate, including Salt Cake .....cwt.	264,840	77,713	28,237	11,642
All other Compounds cwt.	73,881	65,674	90,924	68,529
Total ..... ,,	1,059,239	769,978	429,734	312,654
Zinc Oxide .....tons	172	270	6,106	8,858
Chemical Manufactures, etc., all other sorts value	—	—	346,665	319,239
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) ... ,,	—	—	1,601,418	1,356,642
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....ozs.	182,715	116,704	18,377	11,566
All other Sorts ...value	—	—	305,319	248,649
Total ..... ,,	—	—	323,696	260,215
DYES AND DYESTUFFS—				
Products of Coal Tarcwt.	16,641	12,118	108,512	95,362
Other Sorts ..... ,,	7,686	7,905	8,346	7,930
Total ..... ,,	24,327	20,023	116,858	103,292
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground, and Blanc Fixe ....cwts.	2,893	1,022	1,533	536
White Lead (dry) . ,,	4,951	4,493	9,904	8,744
Paints and Colours in Paste form .... ,,	50,906	34,242	111,387	67,943
Paints and Enamels Prepared (including Ready Mixed) .. ,,	56,933	48,254	182,190	153,413
All other Sorts .... ,,	68,801	68,299	110,075	94,771
Total ..... ,,	184,484	156,310	415,089	325,407
Total of Chemicals, Drugs, Dyes and Colours ....value	—	—	2,457,061	2,045,556

Re-exports

	Quantities Month ended May 31,		Value Month ended May 31,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1929.	1930.	1929. £	1930. £
Acid, Tartaric ....cwt.	142	79	1,184	650
Borax..... ,,	20	384	15	223
Coal Tar Products value	—	—	31	16
Potassium Nitrate cwt.	91	2,443	135	2,715
Sodium Nitrate .. ,,	2,783	5,789	1,494	2,843
Tartar, Cream of .. ,,	574	467	2,814	2,297
All other Sorts ....value	—	—	17,807	18,772
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....ozs.	7,597	3,837	671	344
Bark Cinchona, Bark, Peruvian, etc. ..cwt.	344	254	2,661	2,458
All other Sorts ...value	—	—	32,328	27,172
DYES AND DYESTUFFS—				
Cutch .....cwt.	1,888	1,341	3,274	2,015
All other Sorts .... ,,	227	97	1,868	662
Indigo, Natural ... ,,	2	9	36	213
Extracts for Tanning .....cwt.	1,130	1,784	1,259	2,396
PAINTERS' COLOURS AND MATERIALS .....cwt.	1,008	2,684	3,925	4,709
Total of Chemicals, Drugs, Dyes and Colours ..... ,,	—	—	70,062	67,902

Lord Melchett on Trade Outlook

Upward Trend Reflected by I.C.I.

LORD MELCHETT, in the course of an interview during the week, spoke reassuringly of the state of British trade and industry, and referred to I.C.I. as an indicator of the general position.

"Conditions are beginning to improve," he said. "There are extraneous difficulties, especially in export markets, but, despite the unemployment figures, there is an upward trend. Imperial Chemical Industries with its products touches a great many industries, and in some ways, perhaps, it reflects the general position. In spite of the general depression in trade, the trading profits of Imperial Chemical Industries during the current financial year are up to the level of those for the previous year. The improvement in the position of the rayon industry, which is one of the largest consumers of chemical products, is only just beginning to be shown. When the full effects of this development are felt, there should be a still further and striking improvement in the position of the chemical industry.

"There is probably overmuch pessimism about all over the world. The industrial situation nowhere seems to justify the share position as reflected on the stock exchanges. There is an undue depression of industrial values. The pendulum has swung violently from one end of the scale to the other. It ought to return to a more normal position. In America lately, the figures given have been exaggerated in their effect, because as a matter of fact the actual shares that have changed hands have been relatively small. During the boom periods shares have been bought and sold several times in one day.

"Mergers in industry are valuable, although the improvements of plants may produce temporary unemployment. By mergers you equate losses and depressions in one direction by improvements in others. Imperial Chemical Industries has made great technical improvements ever since it started. We improve our costing figures all the time. We have done trade with Russia on the basis of six months' credit covered by insurance. Arcos has always paid."

Chemical Firm's 100th Birthday Outing

THE FIRM of Thomas Hill-Jones, Ltd., manufacturing chemists, Invicta Works, Bow Common Lane, London, was established at Eaglewharf Road in 1830, and attained its 100th birthday on Saturday. It was fitting, therefore, that that day should have been chosen for the employees' annual outing, and a large party spent a happy day at Margate. Halts were made on the journey down at Maidstone for refreshments and later at Canterbury for a visit to the Cathedral. Dinner and tea were taken at Caudle's Harbour Restaurant, Margate, with Mr. W. S. Lloyd-Willey in the chair.

Discussion on Medical Patents

May and Baker and the A.B.C.M.

IN a letter to *The Times* Mr. N. G. Blenkinsop, director of May and Baker, Ltd., writes:—

The letter on "Medical Patents" in your issue of June 12 calls for some comment by this firm, in view of the fact that it is apt to give the impression that there was unanimous agreement among the members of the Association of British Chemical Manufacturers regarding that part of the memorandum devoted to medical patents. In actual fact, the committee appointed by the A.B.C.M. who were responsible for drawing up the memorandum made no opportunity for the members of the association who were most deeply interested to discuss it.

In our opinion, the memorandum, in so far as it concerned medical patents, was unfortunate and ill-advised, since it was produced under the assumption that there was in existence so considerable a body of ethical opinion antagonistic to the complete ownership of medical patents by individuals or manufacturing firms, and that it was necessary to reach some compromise which would go half-way to meet such a body of opinion and also to satisfy patentees, whether manufacturers or individuals. Actually, no considerable body of such ethical opinion has been found to exist.

The proposals made in the memorandum of the A.B.C.M. committee are, in our opinion, deplorable, as they would inevitably lead to secrecy, which, everyone agrees, should be avoided in the public interest, or to greatly reduced incentive to carry on research work. It is stated in the memorandum that: "A patent in relation to any medical remedy tends at first sight to give the impression of making profit out of human suffering."

Manufacturers of pharmaceutical chemicals and biological products depend for their very existence on making profit out of human suffering, but that in no way detracts from the benefit the public receives from the work they do. Without very considerable gross profits on patented inventions, it would be impossible to bear the very heavy expenses involved in research work.

In conclusion, we should like to express our regret at having to reveal in the Press the fact that there is a divergence of opinion in an association to which we belong, and which should represent the general interests of its members. There are also manufacturers who are not members of the A.B.C.M. who are interested in this question, and who are, we believe, in agreement with our views. Unfortunately, comparatively few firms in this country are really interested at the present time in the question of medical patents, and apparently the committee had not realised to what extent the vastly greater pharmaceutical chemical industries of Germany and America have been dependent on the patent system for their progress, both in research, and in productive capacity. The extent of these industries is, unfortunately, not realised by the general public, but since the question of medical patents is one of national interest, from the point of view of the development of a very extensive industry which, in this country, is still in its infancy, we believe that publicity can only be advantageous. We shall at least have achieved our object if, through publicity, the importance of this question, not only to manufacturers and individuals, but also to the country, is realised.

Anglo-Persian Oil Co. Meeting

THE twenty-first ordinary general meeting of the Anglo-Persian Oil Co., Ltd., was held in London, on Monday, when a record profit of £5,206,761 was announced, and a final dividend of 15 per cent. less tax, making 20 per cent. for the year, was agreed to.

The Chairman (Sir John Cadman) in his speech referred to the activity of the company in its various production fields and said they were well abreast of the times in their refinery programme. The position of the Scottish shale industry had undergone little modification, and they had again received no dividend in their holding of ordinary shares in Scottish Oils, Ltd. By reason of over-production in other quarters, the market for sulphate of ammonia and paraffin wax had been seriously depressed. Their first cracking unit was now in satisfactory operation and the proposed addition of further plant should aid in placing that industry on a firmer basis.

From Week to Week

MR. T. W. SHIELD has just completed 70 years' service with the Blaydon Chemical Works. He started work at 10 years of age.

RECENT WILLS include Mr. William Nicholls of Walthamstow, Essex, late managing director of R. S. Hudson, Ltd., soap makers, of Liverpool, £42,562.

A DEMONSTRATION in honour of Dr. F. G. Banting, the discoverer of insulin, will take place at the opening at Toronto, in September, of the Banting Institute of Medicine.

MR. ALWIN R. DICKINSON, government representative on the board of the British Phosphate Commissioners, retired from this office on May 31, and his successor is Sir Edward George Saltmarsh.

DURING THE THUNDERSTORM on Tuesday, the heavy rain found its way into a chemical storage tank at the Billingham factory of Synthetic Ammonia and Nitrates, Ltd., and caused an explosion, in which William Owen, a foreman, was fatally injured.

A CHEMIST with knowledge of the manufacture of essences for confectionery, jelly crystals, etc., is required in Australia. There is also a vacancy in London for an assistant chemist for analysis and large scale testing work. Further details of both vacancies are advertised in this issue.

AN ORDER IN COUNCIL was made on June 13, requiring imported tiles of earth and clay and refractory bricks, blocks and tiles, to bear an indication of origin as from December 13 next. The Order will apply to the goods not only at the time of exposure for sale, but also at the time of importation.

THE PRINCE OF WALES'S inspection of Imperial Chemica Industries' factory at Billingham, on July 2, on the occasion of his visit to Tees-side, is to be quite private and only members of the Royal party will be admitted. During his tour, members of the Works Council, which consists of 60 representatives of the workmen, will be presented to the Prince.

A JOINT STATEMENT was issued at Bradford, on Saturday, by the Executive committee of the National Union of Textile Workers and the Amalgamated Society of Dyers, stating that so far as their members are concerned the wages dispute is regarded as ended at Bradford, Shipley, Greengates and Keighley from Saturday, but continues at Yeadon, Halifax, and Huddersfield.

NEW LABORATORIES for milk research were opened at the United Dairies depot, Scrubbs Lane, Willesden, by Sir Andrew Balfour on Monday. After giving the reasons that had led to the construction of the laboratories, Mr. Ben Davies, managing director, claimed them to be the finest of their kind in the world, and stated that under modern conditions the danger of tuberculosis germs in milk had been eliminated.

MISS FLORENCE CEDERHOLM has been awarded the fellowship, valued at £200, of the Woman Graduates' Association of Melbourne university. She took her M.Sc. degree in 1927 and had a distinguished university career, obtaining first class honours in chemistry, Parts I, II and III, with the Dwight prize in chemistry I, and the Dixon final honours scholarship in chemistry. She proposes studying advanced work in England in micro-analysis, and also taking a course in fermentation chemistry and bacteriology, and mycology, as applied to the fermentation industries.

MR. W. A. D. RUDGE, a science master at Rugby School, gave evidence at the inquest at Stretton-under-Fosse, Rugby, on Monday, into the deaths of a farmer and two of his employees who were overcome by fumes in a farm silo. After the tragedy, he said, he examined the gas from the silo, which contained 50 per cent. of carbon dioxide, 5 per cent. of oxygen, and the remainder was probably nitrogen. There was no carbon monoxide. As this was some hours later, probably some of the strength had evaporated. It would be possible for a person to breathe for a short time air containing 5 per cent. of carbon dioxide, provided there was the ordinary quantity of oxygen; but in this case the carbon dioxide was ten times that strength and there was only a quarter of the necessary oxygen. The liquid oozing from the silo, when analysed, showed that very rapid fermentation had been taking place. The atmospheric conditions on the previous night had been very unusual.

RAIN fell recently on the nitrate pampas in the north of Chile, for the first time in fifteen years.

A FIRE occurred among some bags of charcoal at Cartvale Chemical Works, Paisley, on Saturday last, and did about £100 damage.

DEATHS IN COAL MINES due to explosions of firedamp or coal dust last year number 34, or 3·2 per cent. of the total of 1,076 persons accidentally killed in mines.

THE U.S. TARIFF BILL, which increases the duties on a number of chemical products, was signed by President Hoover on Tuesday, and came into force as from the following midnight.

ONE MAN HAS DIED of shock, following a series of explosions at the factory of the Liquid Air Company at Seraing, near Liége, Belgium, on Wednesday. In the space of two hours 180 containers exploded one after the other.

MR. ALEX M'DONALD, B.Sc., A.I.C., who has been on the technical staff of the gasworks at Motherwell for several years, has been appointed gas engineer and manager of the Motherwell and Wishaw Corporation Gas Department.

A FITTER employed in O'Keefe's Chemical Manure factory, Mill Street, Dublin, was caught in the machinery on Saturday last, and fatally injured. He was inside one of the dryer machines when it was accidentally set in motion by another workman.

MCKESSAN AND ROBBINS (INC.), drug distributors, have been granted an order in the United States District Court, district of Connecticut, cancelling the trade marks in the words "Milk of magnesia" and "Leche de magnesia," claimed by the Charles H. Phillips Chemical Company.

TRADE DEPRESSION, the Wall Street slump, and increasing stocks of the metal, are given as causes of the present price of copper, which has attained the lowest level for 28 years. Tin stocks in this country now total 20,836 tons, and the standard cash price is now the lowest since 1914.

A MONOPOLY for the manufacture and sale of matches in Turkey for 25 years has been granted to an American firm, who are to make an immediate loan of 10,000,000 dollars, bearing interest at 6½ per cent. to the Turkish Treasury, and pay an annual royalty from the profits of 1,800,000 Turkish pounds. The group has also undertaken to build a match factory near Constantinople within two years.

THE REDUCTION of the capital of Lagunas Nitrate Co., Ltd., contemplated by the scheme for amalgamation with the Lagunas Syndicate, Ltd., was duly confirmed by the Court on May 26, and has now become effective. An extraordinary general meeting of the Lagunas Syndicate will be held on Monday, July 7, at Winchester House, Old Broad Street, London, to consider a resolution for the voluntary winding-up of the company.

THE GERMAN RAYON PACT has now come into force, states a message from Berlin, and gives promise of increasing the sales of German producers considerably, as the consumers agree to cover 90 per cent. of their requirements at home. The producers must now reach agreement amongst themselves regarding the distribution of orders and the fixing of prices, and discussions will be taken up at once. The I.G. Farbenindustrie has notified its withdrawal from the Union of Rayon Producers, but it is suggested that this is merely a tactical move.

UNIVERSITY NEWS: *Cambridge.*—It has been agreed to establish for three years a temporary Professorship of Colloidal Physics, which, in the first instance, shall be held by Mr. E. K. Rideal, of Trinity Hall. *Oxford.*—At the Encænia on Wednesday next, the honorary degree of Doctor of Science will be conferred on Dr. Albert Einstein, Professor of Physics at the Prussian Academy of Science in Berlin. *London:* At University College Mr. R. K. Cannan has resigned his Lectureship in Bio-chemistry on his appointment to the Chair of Chemistry in New York University. Mr. G. F. Marrian has been appointed Lecturer, and the title of Lecturer has also been conferred on Dr. W. H. Newton, Mr. F. G. Young succeeding him as Sharpey Scholar. New professors have been appointed to University chairs as follows:—Chemistry (University College), Prof. C. K. Ingold (London), now Professor of Organic Chemistry in the University of Leeds; Physics (Imperial College, Royal College of Science), Professor G. P. Thomson (Cambridge), now Professor of Natural Philosophy in the University of Aberdeen.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Accepted Specifications

327,830. AMINES. Imperial Chemical Industries, Ltd., Millbank, London, and J. Kenner, College of Technology, Sackville Street, Manchester. Application date, March 5, 1929.

m-2-Xylidene is separated from the residual oil after the removal of 1-3-dimethyl-4-aminobenzene and 1 : 4-dimethyl-2-aminobenzene from the mixture of isomeric xylidenes obtained from commercial xylene, by converting it into the nitrate. Details are given.

327,860. DYES. British Celanese, Ltd., 22, Hanover Square, London, G. H. Ellis, H. C. Olpin, and E. W. Kirk, of British Celanese, Spondon, near Derby. Application date, August 1, 1928.

Naphthazarin or its nuclear substitution products or reduction products are treated with ammonia or a substance yielding ammonia, with or without solvents or catalysts, by which nitrogen is introduced. The products are dyestuffs suitable for dyeing organic substitution derivatives of celllulose, regenerated celluloses and animal and vegetable fibres. They may be converted either in the reduced or unreduced state into dyestuff preparations, *e.g.*, by grinding in colloid mills or by treating with dispersing agents, etc. In an example, naphthazarin is treated with ammonia and sodium hydrosulphite in methylated spirits and the leuco product oxidised by air. Other examples are given.

327,864. DYES. Imperial Chemical Industries, Ltd., Millbank, London, A. Davidson, A. J. Hailwood, F. Henesey, and A. Shepherdson, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 15, 1929.

Leuco indigo preparations are made by reducing dispersed indigo having a particle size less than 10 μ by alkali and reducing sugar, *e.g.*, glucose, or invert sugar from beet-molasses. The proportions are not more than one molecule of sugar and not more than seven molecules of alkali to each molecule of indigo. An example is given.

327,885. POTASSIUM MONOPHOSPHATE. Kali-Forschungs-Anstalt Ges., 5, Schönebergerstrasse, Berlin. International Convention date, November 19, 1928.

Potassium chloride is heated with an excess of phosphoric acid of over 30 per cent. strength at 130° C. under reduced pressure until the chlorine is driven off. The acid salt $KH_2PO_4.H_3PO_4$ crystallises on cooling, and is treated with sufficient potassium monophosphate solution or water to precipitate potassium monophosphate. The liquor is saturated with the acid salt and monophosphate and with the liquor from the crystallisation of the acid salt is mixed with a further quantity of phosphoric acid and used for treating a further quantity of potassium chloride.

327,909. POTASSIUM NITRATE. O. Kaselitz and Kali-Forschungs-Anstalt Ges., 5, Schönebergerstrasse, Berlin. Application date, June 13, 1929.

Potassium chloride is treated with aluminium nitrate, or alumina and nitrous gases or nitric acid to form a solution saturated at 0° C. with potassium nitrate, aluminium nitrate and aluminium chloride, or alternatively with potassium nitrate aluminium chloride and potassium chloride. The solution is concentrated at 50 mm. pressure at 50° C. and cooled to 20° C. when $AlCl_36H_2O$ separates. The liquor is treated with potassium chloride and aluminium nitrate equivalent to the aluminium chloride separated, and water to replace that lost. The solution is cooled to 0° C. to separate potassium nitrate, and the first operation repeated. An alternative method is given.

327,924. MENTHANE. Schering Kahlbaum Akt.-Ges., 170, Müllerstrasse, Berlin International Convention date, June 8, 1929.

Di-pentene is heated with hydrogen under pressure in the presence of a nickel hydrogenation catalyst until combination with hydrogen is complete, and the menthane is then separated

327,938. POTASSIUM CARBONATE. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, October 16, 1928.

Crude potassium carbonate liquor is saturated with ammonia and separates into two layers. The upper layer contains most of the alkali chloride and pure potassium carbonate may be crystallised from the lower layer.

327,946. SYNTHETIC RESINS. Imperial Chemical Industries, Millbank, London, and H. H. Morgan, Revelstoke, Slough, A. A. Drummond, The Lodge, White Cottage, Iver, Bucks, and G. C. Attfield, The Oaks, Stoke Poges, near Slough. Application date, November 6, 1928.

A polyhydric alcohol such as glycerine, a dibasic acid or anhydride, *e.g.*, phthalic, succinic, maleic or citric acid, or a glycerine fatty acid ester such as vegetable or fish oil, and an alcohol boiling below 175° C. such as cyclo-hexanol, butyl alcohol, alkyl mono-ethers of ethylene glycol, or ethyl lactate, are heated together, with or without a solvent to obtain synthetic resins. In an example, phthalic anhydride, glycerine, commercial hexanol, tung oil, and a solvent of the tetrahydronaphthalene type, are boiled at 190° C. under reflux. The product is diluted with acetone or solvent naphtha, and used as a varnish. Several other examples are given.

327,956. METAL CARBONYLS. J. Y. Johnson, London. From J. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 14, 1928.

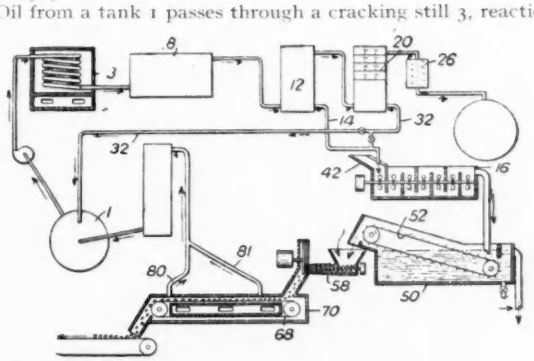
Metal sulphides, carbonates, and oxides are treated with carbon monoxide at 200°–400° C. and pressure of 20–1,200 atmospheres to obtain metal carbonyls. The reduction of the metal compound is facilitated by adding copper, lime, or caustic alkali, and the decomposition of the carbon monoxide is prevented by the presence of carbon disulphide or alkali or alkaline earth sulphides. Examples are given of the production of carbonyls from nickel oxide, sulphide, carbonate, and chloride, and iron oxide and ferrous chloride.

327,967. DYES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 12, 1929.

A 4-amino-3-halogen-anthraquinone-1 : 2-acridone is halogenated to introduce one or more halogen atoms into the benzene ring, or 1-amino-2 : 4-dihalogen-anthraquinones are treated with halogen-anthanilic acids or their salts in the presence of an acid fixing agent and a catalyst such as cupric chloride, and the product is condensed with ring closure by treating with an acid condensing agent such as concentrated sulphuric acid or chlor-sulphonic acid. In an example, 4-amino-3-brom-anthraquinone-1 : 2-acridone is treated with chlorine to obtain a product which dyes cotton bluish-green shades. In another example, 1-amino-2 : 4-dibrom-anthraquinone is condensed with potassium-2-amino-3 : 5-dichlorobenzoate. The product is boiled with dilute hydrochloric acid, and the ring closed with concentrated sulphuric acid. The product dyes cotton bluish-green shades.

327,970. CRACKING HYDROCARBONS. W. E. Trent, 52, Broadway, New York. Application date, January 12, 1929.

Oil from a tank 1 passes through a cracking still 3, reaction



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vessel 8, and vaporiser 12, from which gasoline is drawn off to a column 20 where it is further fractionated, and the vapour condensed in a condenser 26. The residues from vaporiser 12

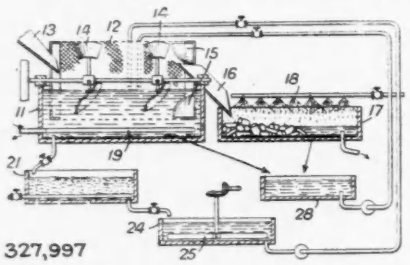
and column 20 pass to an amalgamator 16 where they are mixed with pulverised carbonaceous material and water. Alternatively, the residue from column 20 may be returned to the tank 1. A mixture of carbonaceous material and oil is freed from ash and water in a separator 20, and is conveyed to a briquetting machine 58 from which the briquettes pass on a conveyor 68 through an oven 70. The vapours pass off through pipes 80, 81, and are condensed and returned to the tank 21, and a hard smokeless fuel remains.

327,996. SYNTHETIC DRUGS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 15, 1929.

An *o*- *m*- or *p*- carbamino-arylamine is diazotised and treated with an antimony compound, the resulting organo-stibinic acids in the form of their salts with organic or inorganic bases having therapeutic properties. In an example, diazotised 4-carbamino-1-aminobenzene is treated with a solution of antimony oxide in hydrochloric acid in the presence of glycerine to obtain *p*-carbamino-phenyl-stibinic acid, the salts of which with potash and nitrogen bases are then obtained.

327,997. DETINNING SCRAP. H. Wade, London. From W. B. Ballantine and M. G. Gilbert, Beach House, New Brighton, Port Elizabeth, South Africa. Application date, January 15, 1929.

Tin plate and tin-bearing metals are treated with lead acetate solution to which caustic alkali is added until the white cloud formed just disappears. The detinning solution, 11 is



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heated to boiling point by a steam coil 19, and the scrap metal is fed into a perforated drum 12 which is rotated in the solution. The tin is replaced by lead, which is non-adherent, and the detinned scrap is conveyed by lifters 15 through shoot 16 to tank 17, where it is washed with a water spray 18. Lead from the tanks 11, 17, is transferred to tank 28 where it is treated with acetic acid, and the lead acetate is used again. The tin-containing solution is treated with carbon dioxide in a tank 21 to precipitate meta-stannic acid, and the solution is then treated in a tank 24 with burnt lime to regenerate the caustic alkali for use again. Alternatively, the tin-containing solution may be treated with zinc to precipitate the tin, or with milk of lime to precipitate calcium stannate which may be electrolysed.

328,003. SYNTHETIC RESINS. Imperial Chemical Industries, Millbank, London, W. Baird, R. Hill and E. E. Walker, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, January 9, 1929.

A polyhydric alcohol and a polybasic acid are condensed in the presence of a monocarboxylic acid, and a drying oil is incorporated before or during condensation. In an example, glycerol, phthalic anhydride and oleic acid are heated to 200°–210° C., linseed oil added, and the temperature raised to 220°–230° C. for two hours. Another example describes a resin from glycerol phthalic anhydride, linseed oil acids, and chinawood oil.

328,005. METAL CARBAMATES, ALKALINE EARTH CYANOGEN COMPOUNDS AND UREA. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 14, 1929.

Metal salts, *e.g.*, sodium chloride, calcium chloride or nitrate, barium chloride, nitrates of magnesium, strontium, copper, zinc, manganese, silver, nickel, or lead, are dissolved in liquid ammonia and treated with carbon dioxide to obtain carbamates or addition compounds of carbamates and ammonia only slightly soluble in liquid ammonia. The carbamates may be heated to obtain carbonates or oxides, or treated with water or steam to obtain carbonates or bicarbonates, or heated to 150°–180° C. with liquid ammonia under pressure to obtain metal carbonates and urea. In the case of alkaline earth metals, heating the carbamates yields cyanamides, or cyanates, which may be reduced to cyanides.

328,008. GAS PURIFICATION. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 15, 1929.

Coal gas, or gas obtained by cracking tar, is washed in successive vessels with sulphuric acid of 70 per cent., 87 per cent., and 92 per cent. strength, and then treated with active carbon or washing oil for benzene absorption.

328,029. NITROGEN PEROXIDE. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, November 13, 1928.

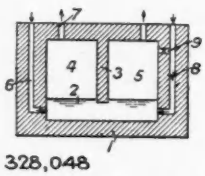
Gases containing lower oxides of nitrogen obtained by catalytic oxidation of ammonia or nitrogen are treated to convert the oxides of nitrogen into nitrites, nitrates, or nitrosyl compounds. Nitric oxide is obtained in concentrated form from these compounds, and is mixed with oxygen to obtain nitrogen peroxide. Nitrites may be decomposed with nitric acid, and nitrates or nitrosyl chloride with sulphur dioxide, or other reducing agent.

328,032. HYDROXY-SULPHAMINIC ACIDS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 13, 1928.

These acids and salts capable of coupling with diazo compounds are obtained by the action of N-sulphonating agents such as chlorosulphonic acid, chlorosulphonic esters, a solution of sulphur trioxide in tetrachlorethane, or pyridine-sulphuric acid, on aminonaphthols, aminoaryl-pyrazolones, aminoarylides of acetoacetic acid, or aminoarylides of 2:3-oxynaphthoic acid, in presence of an acid fixing agent such as pyridine, quinoline or diethylaniline. A number of examples are given. The hydroxysulphaminic acids may be coupled with diazo compounds to obtain azo dyes.

328,048. HYDROGEN. D. Tyrer, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, January 25, 1929.

Methane or gases containing it is brought into contact with molten iron and the iron is blown with air to burn out the dissolved carbon produced in the reaction. The gas is blown



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through pipe 6 into the molten iron 2, and hydrogen escapes through passage 7 from compartment 4. Air is blown through pipe 8 into the iron in compartment 5 and also through valve 9 to the space above the iron to ensure complete combustion of the carbon to carbon dioxide. The iron may be at 1,200°—1,300° C., and may contain manganese to increase the solubility of the carbon, or nickel to act as a catalyst in the dissociation of methane.

328,083. 1:3-BUTYLENE GLYCOL. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 9, 1929.

Aldol is hydrogenated in presence of a catalyst of copper with or without nickel, cobalt or precious metals. The catalyst may be obtained by reducing copper silicate and may be on silicagel or vitreous alumina. 1:3-butylene glycol is obtained.

328,104. LEUCO-INDIGO. Imperial Chemical Industries, Ltd., Millbank, London, and K. H. Saunders, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 8, 1929.

Leuco-indigo is obtained by passing a stream of alkaline indigo paste over a nickel catalyst on a rigid or semi-rigid support in the presence of hydrogen under pressure at a temperature of 120°—140° C.

328,115. INDIARUBBER. Imperial Chemical Industries, Ltd., Millbank, London, S. Coffey and W. J. S. Naunton, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, April 18th, 1929.

Organic compounds capable of dissociation into free radicles containing divalent nitrogen such as tetraphenyl-hydrazine

and N-triphenyl-methyl-diphenylamine are used as anti-agers for rubber.

[NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: —306,214 (I.G. Farbenindustrie Akt.-Ges.), relating to hydrogenated amines, see Vol. XX, p. 412; 306,415 (I.G. Farbenindustrie Akt.-Ges.), relating to azo dyestuffs, see Vol. XX, p. 412; 307,926 (I.G. Farbenindustrie Akt.-Ges.), relating to nitrogen-containing derivatives of the benzanthrone series, see Vol. XX, p. 507; 312,169 (F. Jost), relating to mixed fertilisers, see Vol XXI, p. 90; 314,448 (I.G. Farbenindustrie Akt.-Ges.), relating to α-para-hydroxy phenyl-β-methyl-amine propanol, see Vol. XXI, p. 203; 315,854 (Selden Co.), relating to catalytic oxidation of organic compounds, see Vol. XXI, p. 294; 316,605 (F. C. Palazzo and F. Palazzo) relating to production of dicalcium phosphate and nitrates, see Vol. XXI, p. 314; 316,664 (Appareils et Evaporateurs Kestner), relating to mixtures of ammonium and calcium nitrates, see Vol. XXI, p. 664.]

Specifications Accepted with Date of Application

306,963. Anthraquinone derivatives, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 29, 1928.

307,492. Alloy steels. Vereinigte Stahlwerke Akt.-Ges. March 10, 1928.

307,935. Refining benzene. Soc. du Gaz de Paris. March 17, 1928.

309,859. Destructive hydrogenation of carbonaceous materials. Naamlooze Vennootschap de Bataafsche Petroleum Maatschapij. April 16, 1928.

308,666. Carboxylic acid halides, Manufacture of. I.G. Farbenindustrie Akt.-Ges. March 23, 1928.

312,063. Electric devices for heating a metal melt within a ladle. F. Krupp Akt.-Ges. May 18, 1928.

312,988. Annealing metal strips, Method of and apparatus for. Electric Furnace Co., Ltd. June 4, 1928.

314,020. β-anthraquinone carboxylic acids and esters thereof, Manufacture of. I.G. Farbenindustrie Akt.-Ges. June 21, 1928.

315,811. Metallic compounds, Reduction of—and production of arsenates. G. N. Kirsebom. July 18, 1928.

316,136. Crystalline phosphates, Manufacture of. Victor Chemical Works. July 23, 1928.

316,966. Barium sulphide, Production of. Kali-Chemie Akt.-Ges. August 7, 1928.

329,957. Heat-treatment of granular carbonaceous material, Apparatus for. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). January 26, 1929.

329,959. Conversion of hydrocarbons of high boiling-point into those of lower boiling point. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). February 22, 1929.

329,960. Azo-dyestuffs insoluble in water, Manufacture of. I.G. Farbenindustrie Akt.-Ges., E. Hoffa and E. Thoma. February 25, 1929. Addition to 286,274.

329,961. Azo dyes and their application to the dyeing of regenerated cellulose materials, Manufacture of. Imperial Chemical Industries, Ltd. and R. Brightman. February 25, 1929.

329,973. Removing or recovering sulphur from fluids, Process of. Premix Gas Plants, Ltd., and A. Docking. January 25, 1929.

329,969. Rubber or polymerisation products of diolefines which are plastic or elastic or which possess both properties, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). February 27, 1929.

329,987. Organic mercury compounds, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). February 26, 1929.

330,018. Moulds for the manufacture of castings from metals or alloys. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). March 11, 1929.

330,025. Cracking or destructive hydrogenation of oils, or suspensions of coal in oil, Process and apparatus for. T. G. Hunter and Imperial Chemical Industries, Ltd. March 16, 1929.

330,040. Firmly adhering electrolytic metal deposits upon articles plated in the molten bath, Production of. H. Stefke. March 26, 1929.

330,045. Benzene, Process of refining. Soc. du Gaz de Paris. November 29, 1928. Addition to 307,935 and 314,052.

330,106. Releasing the pressure of mixtures of solids and liquids existing under high pressure, Method of. W. R. Tate, H. P. Stephenson, H. P. Dean, and Imperial Chemical Industries, Ltd. May 9, 1929.

330,146. Calcined borax, Production of. American Potash and Chemical Corporation. March 11, 1929.

306,844. Azo dyestuffs on the fibre, Manufacture of. I.G. Farbenindustrie Akt.-Ges. February 25, 1928.

330,026. Acetic acid from pyroligneous acid, Extraction of. Soc. Anon. des Distilleries des Deux-Sèvres. January 25, 1929.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

Benn, C. H., C. H. L., and C. L. Tar distillation, etc., stills. 17,988. June 12.

Boecking, O. A., Demgenski, C., Flügger, E., Reichhold, C., and Zahn, Dr. Production of alkyl substituted aromatic hydroxyl compounds. 18,210. June 13. (Austria, June 27, 1929.)

Burmah Oil Co., Ltd., and Downer, R. E. Obtaining carbon, and products of pyrolysis and oxidation from flames. 18,122. June 13.

Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Chlorination of diphenyl. 17,815. June 10.

—— Manufacture of leuco sulphuric acid esters, etc. 18,108. June 12.

—— Manufacture of esters of the leuco compounds of vat dyestuffs. 18,228. June 13.

Coal-Oil Extraction, Ltd. Refining acid oils, etc. 17,956. June 11. (United States, June 11, 1929.)

Coley, H. E. Treatment of ores, oxides, etc. 17,862. June 10.

—— Manufacture of zinc. 17,863. June 10.

—— Extraction of metals from ores. 18,177. June 13.

Dreyfus, H. Treatment of aliphatic compounds. 17,842. June 10.

—— Manufacture of cellulose derivatives. 18,022. June 12.

Du Pont de Nemours and Co., E.I., and Triggs, W. W. Dyestuffs of the anthracene series. 18,146. June 13.

Fairweather, D. A. W., Scottish Dyes, Ltd., and Thomas, J. Dyes and dyeing. 18,217. June 13.

Groves, W. W., and Klär and Entphenolungs Ges. Treatment of effluents. 17,860. June 10.

Groves, W. W., and I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial masses. 18,073. June 12.

Haake, J. W., and Hoppler, E. F. Manufacture of starch in powdered form. 18,195. June 13.

I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of liquid hydrocarbons. 17,821. June 10.

—— Production of carbon black. 18,176. June 13.

—— Production of anthraquinone derivatives. 18,271. June 14.

I.G. Farbenindustrie Akt.-Ges. Manufacture of artificial Masses. 18,073. June 12.

—— Dry spinning artificial fibres. 18,075. June 12. (Germany, June 13, 1929.)

—— Preparation of cleansing agent. 18,100. June 12. (Germany, July 15, 1929.)

—— Purification of waxes. 18,109. June 12. (Germany, June 12, 1929.)

—— Manufacture of ortho amino carboxylic acid esters. 18,178. June 13. (Germany, June 14, 1929.)

—— Manufacture of easily soluble salts of 3-acetylamino-4-hydroxy benzene arsonic acid. 18,179. June 13. (Germany, June 14, 1929.)

—— Manufacture of acylamino-benzene stibinic acids. 18,180. June 13. (Germany, June 15, 1929.)

Imperial Chemical Industries, Ltd. Pressure reducing devices for liquids. 17,757. June 10.

—— Apparatus for collecting grass, etc. 17,813. June 10.

—— and Tyrer, D. Production of sulphur. 17,866. June 10.

—— and Tyrer, D. Treatment of iron ores containing sulphur. 17,867. June 10.

Imperial Chemical Industries, Ltd., Manufacture of cellulose ethers. 17,924. June 11.

—— Coating, etc., compositions containing cellulose ethers. 18,061. June 12. (United States, June 12, 1929.)

——Method of producing discontinuity in cords of plastic material. 18,064. June 12.

—— Vulcanisation of rubber. 18,196. June 13. (United States, June 13, 1929.)

Kappeler, H. Manufacture of aldehyde condensation products. 18,072. June 12. (Switzerland, June 12, 1929.)

McDougall, J. Manufacture of absolute alcohol. 18,242. June 14.

Minchin, S. T. Obtaining carbon, and products of pyrolysis and oxidation, from flames. 18,122. June 13.

Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Manufacture of sulphonic acids. 17,918. June 11. (Holland, June 18, 1929.)

Naamlooze Vennootschap W. A. Scholten's Chemische Fabrieken. Manufacture of substances for use in size. 17,795. June 10. (Germany, June 17, 1929.)

Schering-Kahlbaum Akt.-Ges. Manufacture of acrolein. 17,816. June 10. (Germany, June 15, 1929.)

—— Manufacture of piperidine. 17,817. June 10. (Germany, June 21, 1929.)

Wacker Ges. für Elektrochemische Industrie Ges., Dr. A. Manufacture of alkoxy aldehydes. 18,074. June 12. (Germany July 20, 1929.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0⅝d. per lb. d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8½d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9½d. and 10d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3⅜d. per lb. Liquor, £18 15s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8½d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3⅜d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3½d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in returnable casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 7½d. per lb. Crude 60's, 2s. 2d. to 2s. 5d. June, 2s. to 2s. 1d. July-Dec. per gall.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 6d. per gall. B.P., 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 7d. to 2s. 10d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. to 2s. 2d. Dark, 1s. 6d. to 1s. 9d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4¾d. to 5¼d. per gall. 1100, 5¼d. to 6d. per gall.; 1110, 6d. to 6¼d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 1s. 11d. per gall. Pure, 1s. 11d. to 2s. 3d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6¼d. to 6⅜d. per gall. Home, 4d. per gall. d/d. Middle oil, 4¼d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1¼d. to 1⅜d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8¼d. to 8⅜d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2½d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £4 10s. per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Flaked, £14 to £15 per ton.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

o-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

p-CRESOL 34·5° C.—1s. 9½d. per lb., in ton lots.

DICHLORANILINE.—1s. 10d. per lb. f.o.r. works.

DIMETHYLANILINE.—Spot, 1s. 9½d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7½d. per lb.; 66/68° C., 9d. per lb. f.o.r. works.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

a-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

B-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

a-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

o-NITRANILINE.—5s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

o-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 1d. per lb. ex works.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—4 1/16d. to 4½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 9d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.
ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 6d. to 1s. 6¾d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 1¾d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ¼ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb.
BISMUTH CARBONATE.—6s. 6d. per lb.
BISMUTH CITRATE.—6s. 9d. per lb.
BISMUTH SALICYLATE.—6s. 7d. per lb.
BISMUTH SUBNITRATE.—5s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 4s. 4d. per lb.
BISMUTH OXIDE.—8s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. per lb.
BISMUTH SUBGALLATE.—6s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 5½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 8d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 3s. to 3s. 2d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb. for 28 lb. lots. Green, 3s. 1d. per lb., list price. U.S.P., 2s. 4d. to 2s. 7d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 17s. per lb. net; Synthetic, 9s. 6d. to 11s. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb.
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENAZONE.—5s. 6d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—94s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 3d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125 lb. kegs
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—43s. 6d. per lb.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—1s. 11d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 3d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 8s. 3½d. to 9s. 2d. per lb., according to quantity. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—11s. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—8s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—9s. 6d. per lb.
GERANIOL (PALMAROSA).—18s. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. 6d. per lb.
ISO EUGENOL.—11s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—46s. per lb.
SAFROL.—2s. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—13s. 6d. to 15s. per lb. Ex Guaiacol, 12s. 6d. to 13s. 9d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.
ANISE OIL.—5s. per lb.
BERGAMOT OIL.—10s. 6d per lb.
BOURBON GERANIUM OIL.—20s. per lb.
CAMPHOR.—White, 2s. per lb.
CANANGA.—Java, 9s. 9d. per lb.
CASSIA OIL, 80/85%.—4s. 9d. per lb.
CINNAMON OIL LEAF.—6s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 7d. per lb., c.i.f. U.K. port.
LAVENDER.—Mont Blanc, 38 to 40%, 11s. per lb.
PALMA ROSA.—10s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, June 19, 1930.

THERE has been a little better demand during the past week for a number of products, although business still remains rather slow with interest only being shown for early delivery. Prices are on the whole unchanged.

General Chemicals

ACETONE.—In fairly good demand with the market firm at £71 10s. to £80 per ton, according to quantity.

ACETIC ACID.—Unchanged at £36 10s. for 80% technical and £37 10s. for 80% edible, with a satisfactory demand.

ACID CITRIC.—Inactive and price is still unsteady at about 1s. 6½d. to 1s. 7d. per lb., less 5%.

ACID LACTIC.—Unchanged at £42 per ton for 50% by weight, pale quality material, and there has been a little better demand.

ACID OXALIC.—The market is firm at £30 7s. 6d. to £32 per ton, according to quantity, and a steady trade is passing.

ACID TARTARIC.—Still somewhat slow of sale with prices a little steadier at about 1s. 2d. less 5%.

ALUMINA SULPHATE.—Continues in good request at £8 to £8 15s. per ton for 17/18% iron free quality.

ARSENIC.—A little steadier tone is noticeable at £15 15s. per ton, free on rails at the mines.

CREAM OF TARTAR.—Only in small request with price about unchanged at 93s. to 94s. per cwt., ex wharf London.

COPPER SULPHATE.—A fair amount of business has been transacted and price is unchanged at £21 10s. to £22 per ton, free on rails London.

FORMALDEHYDE.—There has been a little better demand and the price is steady at £33 10s. per ton.

LEAD ACETATE.—White quality is quoted at £40 5s. per ton with brown at £39 5s. and demand is a little better.

LEAD NITRATE.—Unchanged at £30 to £32 per ton, with a fair demand.

LITHOPONE.—£19 15s. to £23 per ton, according to quantity and grade, and in fair request.

CARBONATE OF POTASH.—Unchanged at £27 per ton for 96/98% arsenic, free quality.

SODA BICHROMATE.—In good request at 3⅜d. per lb.

SODIUM HYPOSULPHITE.—There is a good demand for photographic crystal quality at £14 15s. per ton and commercial quality is in steady request at £8 10s. to £9 per ton.

SODIUM SULPHIDE.—Unchanged.

TARTAR EMETIC.—In small request at about 11d. per lb.

ZINC SULPHATE.—In better demand at about £12 10s. per ton.

Coal Tar Products

The market for coal tar products is almost unchanged, although the inquiry for motor benzol and solvent naphtha is strengthening.

MOTOR BENZOL.—Firm at about 1s. 5½d. to 1s. 6½d. per gallon, f.o.r.

SOLVENT NAPHTHA.—Remains firm at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA.—Unchanged at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL.—Remains at 3d. to 3½d. per gallon, f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Quoted at 2s. per gallon for the 98/100% quality, and at 1s. 10d. per gallon, ex works, for the dark quality, 95/97%.

NAPHTHALENES.—The firelighter quality is quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—Unchanged, at a nominal price of 40s. to 45s. per ton, f.o.b. East Coast Port.

The following additional prices have also been received :—

Carbolic Acid.—Business is mainly moderate and the price is unchanged from 7d. to 7½d. per lb. Indications are that lower offers are not so frequent.

Cresylic Acid.—Fair business passing with prices, however, generally lower. Pale cresylic acid, 97/99%, is offered at 1s. 10½d. to 2s. per gallon, with better qualities and special grades at 2s. 6d. to 2s. 8d. per gallon.

Vanillin, from Clove Oil.—Unchanged, with 1 cwt. lots at 14s. per lb., and smaller quantities at 14s. 3d. to 14s. 6d. per lb.

Phenolphthalein.—No change—5s. 11d. to 6s. 1½d. per lb.

Nitrogen Fertilisers Market

Sulphate of Ammonia.—Export.—The demand for sulphate of ammonia has been smaller, and the market has receded to £7 7s. 6d. per ton, f.o.b. U.K. port in single bags, for neutral quality basis 20·6 % nitrogen. *Home.*—Small sales are still being made for immediate consumption in certain areas. Some merchants are anxiously awaiting the price scale for the new season. It is understood that a large drop in price will take place.

Nitrate of Soda.—Estimates of the consumption for the season 1929–30 generally show a drop of 15% on that of the previous year. It is understood that the new organisation will endeavour to increase sales, and that as they propose reducing costs by concentrating production at the best situated oficinas there is a certain amount of optimism in nitrate circles. It will be difficult to form an opinion as to whether this is justified until the prices for the new season are announced.

Latest Oil Prices

LONDON, June 18.—LINSEED OIL was steady for near, but 2s. 6d. to 10s. lower forward. Spot, ex mill, £43 nominal ; June, £40 5s. ; July-August, £39 ; September-December, £36 10s., naked. RAPE OIL was neglected. Crude extracted, £36 ; technical refined, £37 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £27 10s. ; refined common edible, £32 10s. ; deodorised, £34 10s., naked, ex mill. TURPENTINE was quiet. American, spot, 40s. 9d. ; July to December, 39s. 6d. per cwt.

HULL.—LINSEED.—Closing prices, £41 15s. for spot ; June, £41 5s. ; July-August, £39 17s. 6d. ; September-December, £37 12s. 6d. per ton, naked. COTTON OIL.—Egyptian, crude, spot, £27 10s. ; edible, refined, spot, £30 10s. ; technical, spot, £30 15s. ; deodorised, spot, £32 10s. per ton, naked. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £28 10s. per ton, naked. GROUNDNUT OIL.—Crushed extracted, spot, £31 ; deodorised, spot, £35 per ton. SOYA OIL.—Extracted and crushed, spot, £28 10s. ; deodorised spot, £32 per ton. RAPE OIL.—Crushed extracted, spot, £34 ; refined, spot, £36 per ton. TURPENTINE, CASTOR OIL, and COD OIL unchanged.

South Wales By-Products

SOUTH WALES by-product activities are slightly more satisfactory. Pitch continues to have only a nominal market with prices unchanged round about the 47s. to 48s. per ton mark. Heavy naphtha remains quiet at from 11d. to 1s. 1d. per gallon, but solvent has a moderate call round about 1s. 4d. to 1s. 5d. per gallon. Refined tars have a better call with values unchanged for both coke oven and gasworks tar. Motor benzol is in fair request at from 1s. 3d. to 1s. 5d. per gallon, but creosote remains weak at from 2¾d. to 3¼d. per gallon. Sulphate of ammonia has practically no call at £10 2s. per ton delivered. Road tar has a steady, but moderate, call round about 13s. per 40-gallon barrel. Patent fuel and coke exports are unchanged, being moderate and unsatisfactory.

Scottish Coal Tar Products

ORDERS continue scarce and any which are passing are for comparatively small quantities. In this area creosote oil is being conserved by the makers for their own purposes and this is keeping values moderately steady.

Cresylic Acid is featureless, the demand being on a very small scale. Pale, 99/100%, 1s. 10d. to 1s. 11d. per gallon ; pale, 97/99%, 1s. 9d. to 1s. 10d. per gallon ; dark, 97/99%, 1s. 8d. to 1s. 9d. per gallon ; high boiling, 1s. 9d. to 1s. 11d. per gallon ; all free on rails.

Carbolic Sixties.—The market is limited and value is nominal at about 2s. 4d. to 2s. 6d. per gallon, ex works.

Creosote Oil.—Quotations are steady despite the lack of demand. Specification oil, 3d. to 3¼d. per gallon ; gas works ordinary, 3d. to 3¼d. per gallon ; washed oil, 3¼d. to 3¾d. per gallon ; all in bulk, ex makers' works.

Coal Tar Pitch is purely nominal at 47s. 6d. per ton, f.a.s. Glasgow for export. The home trade value is easy at about 50s. per ton, f.o.r. works.

Blast Furnace Pitch is unchanged at 30s. per ton f.o.r. works for home, and 35s. per ton f.a.s. Glasgow for export.

Refined Coal Tar.—The continued dry spell is enabling road surveyors to get through their programme without interruption and quotations are firm at 3¼d. to 4d. per gallon, filled into buyers' barrels or tanks free on rails.

Blast Furnace Tar is very dull at 2¾d. per gallon.

Crude Naphtha.—The value is easy at 4d. to 4½d. per gallon, f.o.r. makers' works.

Water White Products are rather firmer in tone, 90/160 solvent is 1s. 3d. to 1s. 4d. per gallon ; 90/190 is 1s. 1d. to 1s. 2d. per gallon ; motor benzole is 1s. 6¾d. to 1s. 7d. per gallon ; all in bulk quantities f.o.r. makers' works.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

Glasgow, June 18, 1930.

THE Scottish heavy chemical market during the past week has been very active, numerous inquiries being received for home and export, particularly the latter. Prices on the whole remain firm.

Industrial Chemicals

ACETONE, B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID, ACETIC.—Prices ruling are as follows: Glacial 98/100%, £53 £64 per ton; pure, £37 10s. per ton; technical 80%, £37 10s. per ton, ex wharf.

ACID BORIC.—Granulated £22 per ton; crystals £23 per ton; powder £24 per ton, packed in 1 cwt. bags, delivered free Great Britain in one ton lots and upwards.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80° QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at the same price, viz.: 3½d. per lb., ex store. Offered from the Continent at 3⅜d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC B.P. CRYSTALS.—Quoted 1s. 4d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f., U.K. ports. Crystal Meal about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f., U.K. ports.

ANTIMONY OXIDE.—Rather easier and spot material now obtainable at round about £33 per ton, ex wharf. On offer for prompt shipment from China at about £29 per ton, c.i.f., U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f., U.K. ports. For Continental material our pirce would be £10 per ton, f.o.b., Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacture contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Now quoted £33 10s. per ton, ex store. Continental material now on offer at about £34 per ton, ex wharf.

GLAUBER SALTS.—English material, quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £34 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £53 10s. per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 8d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅜d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store. Offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE.—99¼/100% Powder. Quoted £25 10s. per ton, ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted at 7d. per lb., ex store. Offered for prompt delivery from the continent at about 6⅝d. per lb., ex wharf.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station, M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅜d. per lb., delivered buyer's premises with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, 27s. 6d. per ton extra. Light soda ash, £7 13s. per ton, ex quay minimum four-ton lots with various reductions for contracts.

SODIUM CAUSTIC.—Powdered, 98/99%, £17 10s. per ton in drums; £18 15s. per ton in casks. Solid, 76/77%, £14 10s. per ton in drums; £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' stations, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum four-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £10 2s. per ton, carriage paid buyers' sidings, minimum five-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered for unground quality. Ground quality, 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid, 61/62%, £9 15s.; broken, 60/62%, £10 15s. per ton; crystals, 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC.—Chloride 98%.—British material offered at round about £20 per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Dead Sea Salts Concession

Official Announcement Expected

AN important official announcement in connection with the Dead Sea Salts Concession is now impending, and will probably be made in the House of Commons, writes a *Daily Telegraph* correspondent.

It is regarded as not impossible that the British Government will declare its readiness to acquiesce in the suggestion of the French Government that the rival claims to this concession of certain British and French interests be submitted to arbitration. Presumably in this case, as in the previous one of the Mavromatis concession, the arbitral authority will be the Permanent Court of International Justice at The Hague.

Should this prove to be so, the greatest public interest is certain to be aroused by the proceedings, not only by virtue of the rich potash deposits involved, but also owing to the prominent political and business personalities connected with the dispute. For instance, the influence of the Bank of France is said to have been diplomatically active in support of the French claimants.

Fumes from Chemical Works

Farmer's Claim for Damage to Crops

AT Wakefield County Court on Tuesday, Judge Woodcock gave his considered judgment in a case of great interest to chemical manufacturers in which Archibald Bird, farmer, Newfield Farm, Normanton, sued the Whitwood Chemical Co., Ltd., for £57 as damages in respect of injury alleged to have been done to crops of wheat and oats by fumes emitted from the defendants' works.

His Honour said he was satisfied that fumes were emitted from the retorts when they were discharged, and that the fumes went over plaintiff's land and injured the crops. The land, however, was not good land. He awarded damages amounting to £29 5s., with costs.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, June 19, 1930.

The market for chemicals on this centre during the past week has made a slow recovery following upon the almost complete stoppage of operations in the previous week as a result of the Whitsuntide holidays. Contract deliveries of a good many lines have been resumed on a scale which is pretty well back to the pre-holiday level, but so far as new bookings are concerned the general experience here has not been too encouraging. There has been a certain amount of inquiry in circulation, but up to the present it has resulted in relatively little addition to the order-books. Meanwhile, values in one or two sections continue to show signs of ease.

Heavy Chemicals

Sulphide of sodium,however, keeps up at round £10 per ton for the 60–65 per cent. concentrated solid quality and £8 for the commercial grade, with demand on a quiet scale. Prussiate of soda is moving off in moderate quantities, the price situation being much the same as before, current offers ranging from 4¾d. to 5¼d. per lb., according to grade. With regard to bichromate of soda, buying interest in this material at the revised rates is of fair extent, current offers being on the basis of 3⅜d. per lb. Only a comparatively quiet trade is going through in the case of chlorate of soda, sales of which are being made at about £25 per ton. There is a quietly steady movement of caustic soda and quotations are well held at from £12 15s. to £14 per ton, according to grade, on the basis of contract deliveries. Alkali is firm at £6 per ton and a moderate trade in this material is reported. Bicarbonate of soda continues to be offered here at about £10 10s. per ton, with inquiry on quiet lines. Saltcake meets with only a moderate call, but at £2 15s. to £3 per ton values in this section are about unchanged. Phosphate of soda is on the slow side at from £11 to £11 10s. per ton for the dibasic quality. Hyposulphite of soda is steady, although no big weight of business is going through; the commercial material is at round £9 per ton and the photographic at £15 10s.

Generally speaking, there has been little movement, either one way or the other, in potash prices. Permanganate meets with a moderate trade, with offers steady at about 5¼d. per lb. for the commercial grade and 5½d. for the B.P. There is some inquiry about for bichromate of potash, quotations for which are on the basis of 4¼d. per lb. Chlorate of potash is on the slow side and easy if anything at up to about £26 10s. per ton. Yellow prussiate of potash is well held at from 6¾d. to 7¼d. per lb., according to quantity, a quietly steady business being put through. Carbonate of potash is about maintained at £25 10s. per ton, with demand on quiet lines, whilst caustic is in a somewhat similar position at from £30 to £31 per ton.

Arsenic continues to attract only moderate attention, but at round £15 15s. per ton at the mines for white powdered, Cornish makes, values have not actually weakened any further. There is a quiet trade passing in sulphate of copper, offers of which are at £24 10s. per ton, f.o.b. The acetates of lime are relatively slow at about £7 10s. per ton for the brown material and £15 for the grey. The acetates of lead are attracting only limited attention, with brown at about £36 and white at £37, nitrate being a dull market at £29 to £30.

Acids and Tar Products

Acetic acid meets with a moderate amount of inquiry and values are well held at round £36 per ton for the commercial 80 per cent. quality, and £66 for the glacial kind. Oxalic acid is on the quiet side still, but at £1 12s. per cwt., ex store, prices show little change on balnace. Both citric and tartaric acids are moving very slowly and are weaker at about 1s. 6½d. and 1s. 1¾d. per lb.

Comparatively little business is offering in any section of the by-products market and in several lines quotations are easy in tendency. Pitch is attracting little attention, but offers are still at about 47s. 6d. per ton, f.o.b. Creosote oil is quoted at 3d. to 4d. per gallon, with limited sales reported. Crude carbolic acid is fractionally easier at round 2s. 4½d. per gallon, naked, for 60's; crystals are in quite demand at 7d. to 7¼d. per lb. Solvent naphtha is now obtainable at 1s. 1½d. per gallon, with only moderate quantities being sold.

Company News

Alianza Co.—A net loss of £71,944 is reported for the year ended December 31, 1929. The annual meeting will be held in Valparaiso on August 12.

Reckitt and Sons.—The directors recommend an interim dividend of 3¾ per cent., less income tax, on the ordinary shares for the quarter, payable on July 1.

F. Steiner and Co.—The directors announce that owing to the long depression in business generally, they have decided to defer payment of dividend on the preference shares for the six months ended June 30.

International Chemical Co. (Basle).—The second annual report shows an increase of Frs. 1,388,802 in net profits, plus Frs. 63,951 brought forward, making Frs. 16,062,000. The Syndicate which has Frs. 105,000,000 ordinary shares (20 per cent. paid up), has renounced any dividend and the proposed distributions are: 6 per cent. on Frs. 40,000,000 preference (20 per cent. paid up), 12 per cent. on Frs. 65,000,000 ordinary (fully paid), 12 per cent. on Frs. 80,000,000 ordinary (50 per cent. paid), less 5 per cent. interest on unpaid amount, which absorbs Frs. 15,880,000. Under arrangements with the German Dye Trust, the Basle company receives from released German property in U.S.A. a further sum for distribution equal to 2 per cent. on the nominal amount (Frs. 145,000,000) of fully paid and 50 per cent. paid ordinary shares. Distributions on the ordinary, after deduction of coupon tax, will then be Frs. 67 90c. on fully paid Frs. 500 shares and Frs. 55 77½c. on 50 per cent. paid Frs. 500 shares.

China Clay Trade During May

Imports

The return of the quantities and value of China Clay, including China stone, imported into Great Britain and Northern Ireland in the month of May is as follows:—

Countries Whence Consigned.	Quantity. Tons.	Value. £
Germany	52	196
Netherlands	21	160
Total	73	356

Exports

Exports of China Clay, including Cornish or China stone, the produce of Great Britain and Northern Ireland, during May were:—

Country of Destination.	Quantity. Tons.	Value. £
Sweden	1,957	4,040
Norway	330	640
Denmark	752	2,035
Germany	757	1,334
Netherlands	1,108	2,605
Belgium	5,070	9,597
France	2,388	5,331
Switzerland	125	398
Spain	196	590
Italy	1,667	3,072
Greece	55	112
Bulgaria	3	35
Egypt	10	44
China	6	50
United States of America	26,312	56,285
Cuba	1	14
Mexico	20	78
Chile	50	196
Uruguay	20	60
Irish Free State	5	21
Union of South Africa	3	37
British India	141	572
Bengal, Assam, Bihar and Orissa	105	501
Malay States	—	14
Hong Kong	—	5
Australia	31	235
New Zealand	3	38
Canada	87	528
Newfoundland and Coast of Labrador	2,082	3,690
Total	43,284	92,158

For Aircraft Experiments

Huge Tunnel for National Physical Laboratory

A VARIABLE density tunnel 50 ft. long and with an internal diameter of 17 ft. has just been completed for use at the National Physical Laboratory at Teddington in connection with special aircraft experiments. It has been constructed at the Sheffield works of John Brown and Co., Ltd., and is claimed to be the largest structure of its kind in the world. The total weight is 250 tons, and it has successfully passed an hydraulic test pressure of 580 lb. per sq. in.

The tunnel has been built up of four seamless hollow rolled steel rings, each of which in the rolled state weighed 50 tons. The hemispherical ends are made of two steel castings joined together by a suitable flanged and studded joint. The castings weighed 26 tons each. One of the most difficult features in connection with the structure, the joining of the separate sections of the vessel, has been effected by a special form of butt strap.

The stresses that occur in aircraft phenomenal speeds, such as are met with in the Schneider Trophy race are, more or less an unknown quantity, and the tunnel is intended to enable all parts to be subjected to conditions similar to those met with in these severe tests. The wind pressure encountered when a machine is travelling through the air at over 300 miles an hour, for instance, is one of the conditions which it is possible to reproduce. The gondolas of airships can also be put in the tunnel and tested as far as possible under actual service conditions.

It will be necessary to dismantle each section of the tunnel for transport by road from Sheffield to Teddington, and special arrangements are being made for its transit.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

BRITISH MALAYA.—Manufacturers' agents seek the representation of British manufacturers of chemists' sundries, excluding patent medicines. A representative is at present in this country. Reference No. 497.

CANADA.—A firm of manufacturers' agents and importers in Vancouver, who have so far been interested in the sale of chemicals to the mining companies and other industrial concerns in the Provinces of British Columbia and Alberta, desire to obtain British agencies on a purchase basis for machinery and equipment for sale to the same concerns. Reference No. 499.

Tariff Changes

AUSTRIA.—A number of increases in the duties affecting chemicals are proposed in the Bill recently introduced into the Austrian Legislature. Hydrochloric Acid, it is proposed, should pay 3.50 gold kronen per 100 kilogs (in place of 2.20 at present); acetic acid, 60 (45); sodium sulphite and bisulphite 14 (9); ammonium sulphate, 5 (3.60); water glass, solid or liquid, 6 (3); carbonate of lime, precipitated, 4 (4); potash alum, 4 (2.50); phosphates treated with acid (superphosphates), 2.50 (1.50); nitrophoska, 3 (10 per cent. *ad val.*); acetone, 60 (40); naphthol, free (10 per cent. *ad val.*); gelatine wares, 60 (40); glue of all kinds, 25 (14.50); potato starch (including potato starch flour), 42 (16); wheat starch (including wheat starch flour, duty on wheat flour plus 8 kr. (10); maize starch (including maize starch flour), 24 (free); pastes and shoemakers' pastes, 35 (18); starch gum (dextrine and other starchy gum substitutes), 60 (20); starch glue, size and similar starchy pasting and dressing products, 25 (10). A few articles will, however, for a time enjoy most-favoured-nation treatment.

U.S. Animal Glue Production

THE United States production of glues of animal origin during the first quarter of 1930 amounted to 29,388,500 lb., of which 15,229,400 lb. was hide glue, 5,022,900 lb. extracted bone glue, and 9,136,200 lb. other bone glue. Stocks on hand at the end of the first quarter of 1930 were 19,533,100 lb. of hide glue and 17,039,100 lb. of bone glue, a total of 36,572,200 lb., as compared with total stocks of 28,654,000 lb. at the end of the preceding quarter and 32,520,400 lb. at the end of the first quarter of 1929.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

PREMIER DRUG CO., LTD., Fairy Hill Works, Marwood Street, Cheetham, drug manufacturers. (C.C., 21/6/30.) £13 10s. May 19.

GIDDINGS, Albert Vernon, 785, Pershore Road, Selly Oak, manufacturing chemist. (C.C., 21/6/30.) £33 12s. 2d. May 9.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

GEE (BEAUMONT) AND CO., LTD., Greetland, dyers and finishers. (M., 21/6/30.) Registered June 4, £500 3rd debenture, to H. M. Hellewell, Stubbin, Beech Road, Sowerby Bridge, dyer; general charge. *£1,500. February 5, 1929.

London Gazette, &c.

Companies Winding Up Voluntarily

DURABLE DYEWORKS, LTD. (C.W.U.V., 21/6/30.) By special resolution, May 27. H. T. Hooley, National Chambers, Goldsmith Street, Nottingham, incorporated accountant, appointed as liquidator.

INDIGO DYEING CO., LTD. (C.W.U.V., 21/6/30.) By reason of its liabilities, June 12. J. S. Hardman, Newgate Chambers, Rochdale, accountant, appointed as liquidator.

Acetate and Acetate Products (Foreign Rights)

PRESIDING at the first annual general meeting of Acetate and Acetate Products (Foreign Rights), Ltd., Sir A. C. T. Beck, the chairman, stated that the issued capital was 1,500,000 shares of 2s. each, of which 500,000 were allotted to the vendors as fully paid, and 1,000,000 were issued to the public. In regard to the latter, there were arrears totalling over £25,000. A portion of the arrears represented shares allotted to sub-underwriters whose cheques were received and paid into the bank when the allotment was made, but subsequently dishonoured. Actions were immediately commenced against those sub-underwriters, who delayed matters by putting in defences of various natures, which necessitated lengthy legal proceedings. Action was being taken against the main underwriters, counsel having advised that under the underwriting agreement they were responsible.

The chairman pointed out that the preliminary and formation expenses totalled £20,854, and were in accordance with the prospectus. The directors were confident that the company possessed an asset of acknowledged value, and the shareholders could rest assured that everything would be done to secure contracts to dispose of the rights in foreign countries.

A resolution was proposed by a shareholder to the effect that the accounts should not be adopted and that a committee should be appointed to confer with the directors and report to the shareholders. That motion, however, was eventually withdrawn, the directors giving an undertaking to co-opt Mr. A. Henderson, one of the shareholders, as a member of the board. The report and accounts were then unanimously adopted.